RD & W 1092

TRANSACTIONS OF THE LINCOLNSHIRE NATURALISTS' UNION

(Lincolnshire and South Humberside)

Vol. XX No. 2 1981

Edited by
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Headquarters: City and County Museum, Lincoln

LINCOLNSHIRE NATURALISTS' UNION
Founded June 12th, 1893

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PRESIDENTIAL ADDRESS

delivered in Lincoln on March 7th 1981

by M.R.D. Seaward

HEATHLANDS IN DECLINE: ECOLOGICAL CHANGES IN LINCOLNSHIRE WARRENS

In 1695, when De la Pryme[1], curate of Broughton, surveyed the heaths around the Scunthorpe area, he remarked that they reminded him of the sandy deserts of Egypt and Arabia[2]; his impressions of the Nettleton area were equally memorable[3]. By the end of the 18th century, much of the heathland throughout the county had been reclaimed through the implementation of the Enclosure Acts, many of these areas being chalked and limed and incorporated into a mixed farming system. Dunston Pillar, a land-lighthouse, built in 1751 on the Lincoln Heath, was intended to guide travellers over the trackless wastes; it became super-fluous within a few years of being built, and the lantern on the top was replaced in 1810 by a statue of George III.

Nevertheless, much unproductive land persisted into the 19th century, particularly in the north-west of the county; an article in the Stamford Mercury[4], referring to the area around Messingham about 1800, describes it as "a swampy tract of peat and peat-earth, interspersed with barren sand-hills and large pits of water, and, when in a state of open common presented an appearance singularly wretched and dreary". On the other hand, Cobbett[5] noted in his diary whilst at Brigg in 1830 how he had not seen "one acre of waste land though I have gone the whole length of the county one way and am now got nearly halfway back another way". By this time, the Wolds which a century earlier had been one continuous rabbit warren and the Heath and Cliff little more had now been transformed into the major farming region of the British Isles.

Further changes to the Lincolnshire heathlands throughout the 19th century are difficult to assess, due to the paucity of literature on the subject; however, plant lists by Fowler[6] and Woodruffe-Peacock[7] for the Scunthorpe area, and an evaluation of the ecological changes to Linwood Warren between 1878 and 1900 by Lees[8] provide some insight into the impact of man. Lees, for example, noted the encroachment of seedling firs as a result of water-cuts, the disappearance of some bogs and the dramatic changes in the plant communities at Linwood in the space of 25 years.

As can be gauged from a critical survey of place names on today's Ordnance Survey maps, heaths and moors, in the broadest sense, were widely distributed over the two upland areas of the county, the Heights and the Wolds, and to a large extent in the lowland areas to the west of each of them (Figure 1). However, the term 'heath', when incorpor-

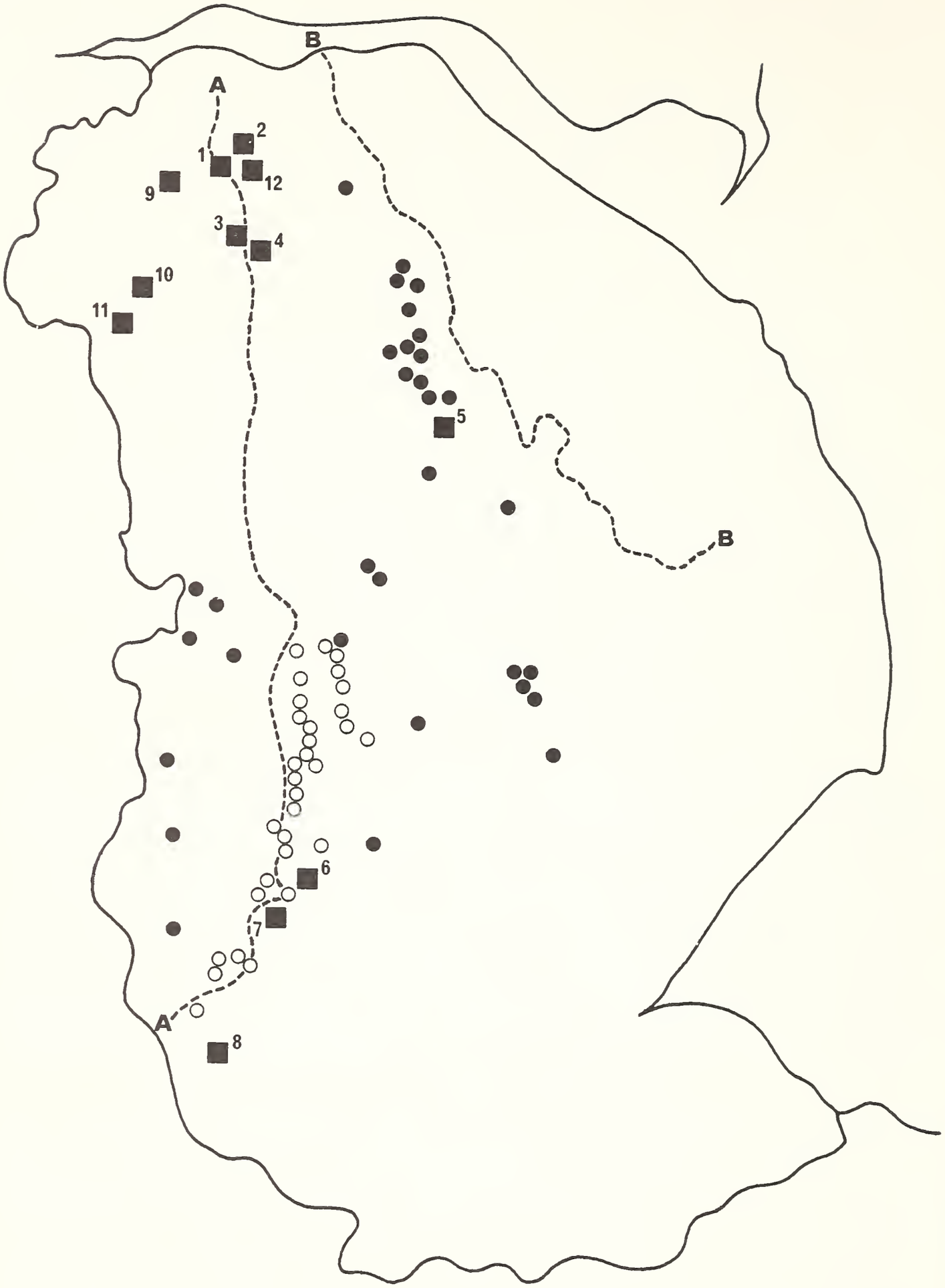


Figure 1. Map of Lincolnshire to show the distribution of those place-names associated with heathland-type habitats. A ---- A Lincolnshire Edge (western scarp of Lincolnshire Heights; B ---- B western edge of Lincolnshire Wolds. 1 = Crosby Warren, 2 = Risby Warren, 3 = Risby Warren, 4 = Manton Warren, 5 = Linwood Warren, 6 = Wilsford Warren, 7 = Heydour Warren, 8 = Stainby Warren, 9 = Brumby Common, 10 = Scotton Common, 11 = Laughton Common, 12 = Santon Warren; o = moors, o = heaths.

ated into local place names, is almost confined to an area south of Lincoln, where no doubt a heathland, dominated by gorse rather than heather, persisted until the late 18th century. The term 'moor' has a less clearly defined distribution, but is generally associated with the cover sands. 'Common' may often be taken to indicate a similar habitat dominated by heather (Calluna vulgaris): Scotton and Laughton Commons, for example, were major heathlands until afforested in the early 1920s, and only a limited amount of heather moorland remains at the former site.

The persistence of the term 'warren' in local place names is particularly interesting, since only a few localities, mainly in the Scunthorpe area, retain it - the exceptions being Linwood and Heydour (Figure 1). Rabbit trappers in the warrens to the north-west of the county provided an important source of local employment into the 19th century; for example, according to Cooke[g] , Brigg's principal industry was concerned with the processing of rabbit skins and "once employed more hands than any other town in the kingdom, except London".

The Scunthorpe Warrens have been researched by the writer for more than 20 years. These heathlands exemplify both the complex nature and present plight of such habitats. Cover sands, mainly 2-6 metres in depth, support a relatively rich variety of plant communities, which vary according to natural factors such as the pH, ionic content and water-table. The variation in pH and ionic content is correlated to the amount of limestone fragments which have worked their way to the surface from the underlying strata or to base-rich water, derived from spring lines in the limestone, which seep through the cover sand[10].

Although such areas receive less than 600mm of rainfall per annum, podsolization occurs, and iron pans develop between 20 and 80+ cm below ground level; in this way, water from a large catchment area is concentrated into pockets, locally known as 'flashes'[11] , and thus wet habitats can be maintained above ground level for part or all of the year. In the past, artificial drainage, often in an attempt to bring these poor, infertile soils into cultivation, has speeded-up the drying-out process, and more recently a period of significantly lower rainfall (Figure 2), which coincided with an extensive programme of drainage in neighbouring fields, has accelerated the process. For example, the seasonal surface water, a familiar feature at Twigmoor Warren in the early 1960s, has not been witnessed now for more than 15 years. As a result of lowering the water-table, dramatic changes in the vegetation have been witnessed over the same period of time. The wet heath areas have been significantly reduced, and such characteristic plants as cross-leaved heath (Ericatetralix), cotton-grass (Eriophorum angustifolium) and bryophytes (e.g. Sphagnum and Drepanocladus spp.) are decreasing. The disappearance of such habitats has facilitated the invasion of birch and bracken(Pteridium aquilinum).

At Twigmoor, the rate of spread of birch has been determined: aerial photographs for 1948 show a c. 8.5% coverage of a 19.4 ha study area; by 1964 the encroachment was c. 18.5% and in 1980 this had exceeded 25%. A 30-40 cm annual increase in the height of birch has been observed on this study area over the past 20 years. Its

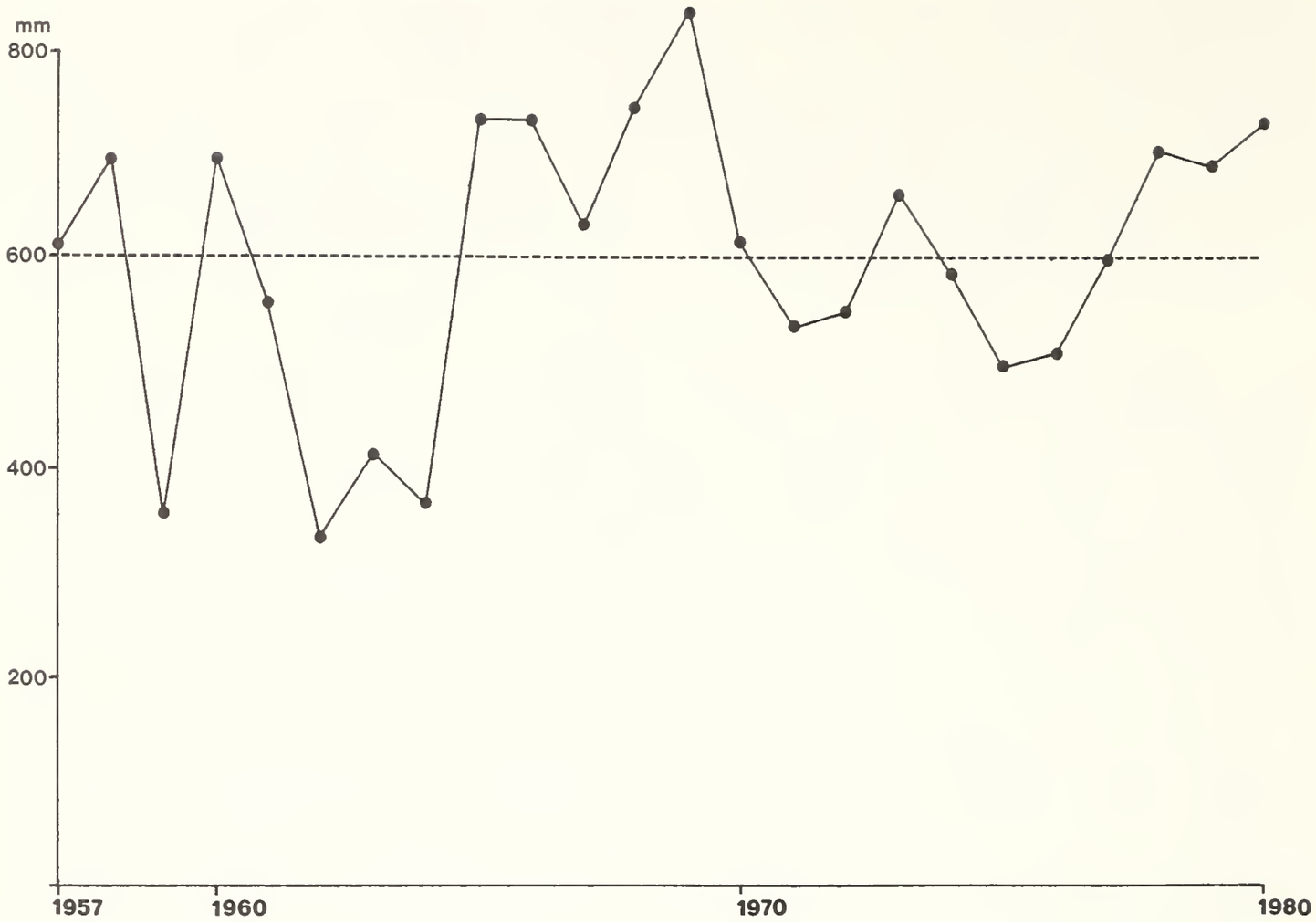


Figure 2. Rainfall in the Scunthorpe area, 1957-1980; mean annual rainfall (598 mm) for the period 1953-1980 is indicated. Note in particular the significantly lower annual measurements for 1962, 1963 and 1964.

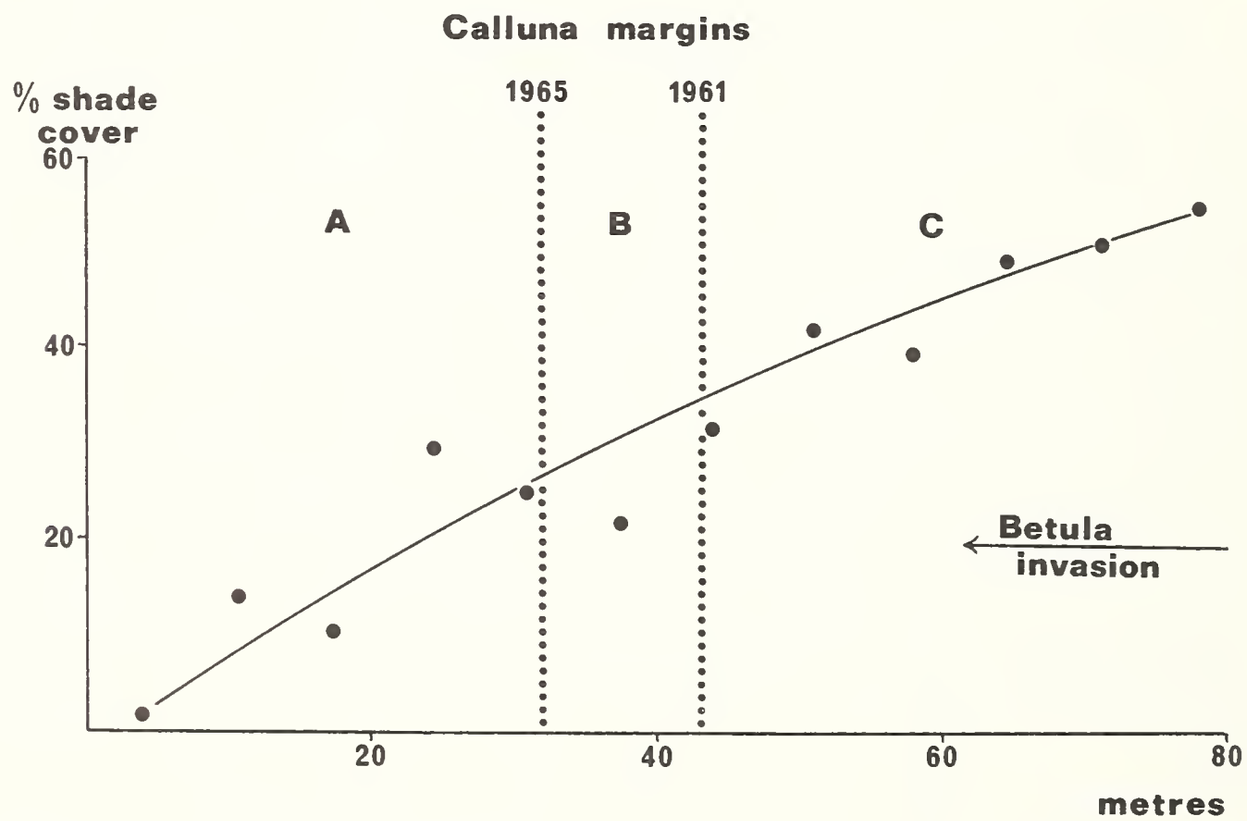


Figure 3. Graph correlating heather (Calluna) degeneration with increasing shade cover by birch (Betula). Light measurements undertaken in 1962; state of Calluna: A = healthy, B = degenerate, and C = dead or no traces found.

spread is also to the detriment of the dry heath communities with both Calluna and Bell-heather (Erica cinerea) being shaded out by the canopy. The rate of degeneration of Calluna with the advance of birch is illustrated in Figure 3. In the early stages of birch growth, the prevention of fire, through the vigilance of gamekeepers and wardens, and the reduction in grazing pressure (see below) have encouraged its spread at the expense of open heathland.

Similarly, Pteridium is highly competitive on mineral soil, to the almost total exclusion of other plant species; large areas, which only a few years ago were dominated by Calluna, Erica cinerea, Deschampsia flexuosa and a widely diverse lichen and bryophyte flora, are now blanketed by this species. Only bluebell (Endymion non-scriptus) and rosebay willow-herb (Epilobium angustifolium), due to their earlier growth period, are able to compete successfully. The continued lowering of the water-table is instrumental in the spread of Pteridium, and where water close to ground level does remain, at least seasonally, rhizomatous growth is seriously curtailed. In the past, Pteridium has been suppressed by beating three or four times per annum in connection with game shoots, a practice which only rarely takes place today on such privately-owned land as still remains; where heathlands have become nature reserves, a policy of laissez faire is often followed.

Conservation bodies have been much involved in the maintenance of open heathland habitats, but their effectiveness is frequently debatable. For example, water movement in podsolic soils are often complex and the creation of artificial cuts and ponds by such bodies may accelerate the drying-out process in adjacent soils; in addition, since birch forms extensive shallow root systems, the uprooting of young trees by hand can be the cause of considerable damage. Conservation practices within such delicately-balanced ecosystems need to be based on a thorough knowledge of all the factors involved at a particular site, or the consequences may be far-reaching and irreversible.

Myxomatosis spread from Kent in October 1953 and reached Lincolnshire in June 1954; the massive decline in the rabbit population brought about dramatic changes in heathland vegetation: the growth of seedling birches was no longer checked by grazing, soils were less disturbed by burrowing, and a rich source of nitrogen was no longer available. The return of the rabbit in appreciable numbers in recent years has to a large extent reversed this process, but where birch has advanced, the process is irreversible.

The heathlands in the north-west of Lincolnshire have been particularly affected by urban expansion and industrial development. It is ironic that some of the few remaining sizeable areas of natural habitat at the turn of the century should overlie the iron ore to which Scunthorpe owes its existence. Not only have heathlands disappeared in mining operations (e.g. Crosby), urban sprawl (e.g. Brumby) and road development (e.g. Twigmoor), but the majority of the heathland sites remaining are subjected to atmospheric pollution emanating from the town and its steelworks.

Risby Warren is the largest remaining area of cover-sand in Lincolnshire (170 ha) and is greatly affected by atmospheric pollutants

such as sulphur dioxide, fluoride and heavy metals. The vegetation and soils at this site have been monitored since 1961. Sampling along a permanent transect has been undertaken to determine the pollution load; further details of this work are to be found elsewhere[12]. It is particularly interesting to note that the steady increase of the pollution load in the 1960s has in recent years declined significantly, due to improvement in the control of the emissions of pollutants, coupled with a decline in steel output. These changes are reflected not only in the pollutants taken up by the plants, but also in their morphology; Calluna, for example, has a clearly defined luxuriant growth around a depauperate central zone whose period of growth occurred under a less favourable regime.

More recently, Risby has been threatened by a new and unexpected factor, namely the appearance in 1980 of several cave-ins, caused by subsidence of the underground workings of Santon mine; these have been filled with imported heavy clay soils, the transport of which has necessitated the creation of haul roads for heavy lorries which traverse Risby Warren for most of its length. The resultant surface disturbance and contamination by both roads and infill has affected a substantial area of vegetation.

Risby Warren has been designated as Grade 1 in a recent appraisal of sites by the Nature Conservancy Council[13], indicating its high educational and scientific potential: alas, as can be gathered from the above account of the many pressures suffered by the Warren, this may never be fully realised. Equally, the other heathlands referred to in this account have the capacity to provide resources for the teacher and scientist, and, subject to certain restrictions, a much-needed recreational facility for those who enjoy and appreciate the countryside.

NOTES

1 Rev. Abraham de la Pryme, B.A., F.R.S. (b.Hatfield 1671 - d.Thorne 1704), Yorkshire antiquary; see Jackson, C., ed. (1870) The Diary of Abraham de la Pryme. Publications of the Surtees Society, vol.54 for 1869. Andrews, Durham.

2 Ibid, p.58:

June 11, 1695

> About this time I was sent for into Lincolnshire, to Roxby, about a liveing. Having passed over the Trent at Althorp, or Authrop, in my going to the aforesayd town, I saw nothing observable but the barrenness of the country, and the sandy commons that I passed over; which I no sooner saw, but it brought into my mind the sandy desarts of Egypt and Arabia, which I had a most clear idea of when I beheld these sandy planes. For here the sand is driven away with every wind, and when the wind is strong it is very troublesome to pass, because that the flying sand flys in one's face, and shooes, and pockkets, and such like, and drives into great drifts, like snow-drifts. This sandy plane is some miles in length, and about a quart-

ter of a mile in bredth. In great winds it does great damage, for sometimes in a night's space it will cover all the hedges that it is near, and cover all the corn land adjacent, etc. I have observed huge hedges quite sandyd up with it to the very top; and a cloas of thistles that was one day almost a yard tall, the wind changing, and I returning the same way the next day, I could but just discover the tops of them. This plane was formerly a much higher country than it is now, for here and there are left a few hills (now we may call them) three yards in height perpendicular, which blows away by degrees, but were formerly eaven with the rest of the blown away land, etc.

3 Ibid, p.67:

August 26, 1695

I have been at Castor again yesterday, on some business, and from thence I went to Nettle(ton), a little mile, to see something there that I thought memorable. All along the hill side there, for at least a mile, lyes a long bed of sand, which has sprung somewhere thereabouts out of the ground, and encreas'd to the aforesayd bigness, having cover'd a great quantity of good ground, and by that means undone several poor people. Within these twenty years it begun to move towards this town, and all that part of it that layd close to the hill edge (which was about twenty-five houses, with their folds and garths) has been destroy'd by it this several years, onely there is one house, which is a poor man's, that has stood it out by his great pains and labour; but as for his folds and gardens they are all cover'd. It had destroy'd a great deal more of this town, but that, betwixt it and the aforesayd houses that were destroy'd, there runs a strong water spring, or brook, which it cannot get over, neither can it fill it, for as soon as any great rains falls, either in summer or winter, upon the hills, it dissends through this brook, and soon washes it to its old channel again, etc. So that this quicksand, not being able to get over, it goes all along by its side and the side of the hill, and last year broke a great hedge down, and has begun to enter into a piece of excellent ground, which it will most certainly destroy. And this was the memorable thing that I went to see. I have read in the Transactions of the Royal Society of a such like sand in the borders of Norfolk, which has almost destroy'd a whole town; but that moves southward, as I remember, but this northward.

4 Stamford Mercury, 20.12.1833; reprint of an article with initials 'J.S.' from The Saturday Magazine, 23/11/1833.

5 Cobbett, W. (1853) Rural Rides... in the Years 1821...1832. (New edition with notes by J.P. Cobbett.) A. Cobett, London, p.594.

6 An interesting list of plants for Crosby Warren in 1854 by Rev. William Fowler, M.A. (b.Winterton 1835 - d.Winterton 1912) appears in a later field meeting report (Naturalist 1910: 391-398); see also Naturalist 1887: 349-351.

7 Rev. Edward Adrian Woodruffe-Peacock (b.Bottesford 1858 - d.Grayingham 1922); see Naturalist 1895: 229-237, 1902: 177-188 and Trans.Lincs.Nat.Un. 4: 22-40 (1916).

8 Dr. Frederic Arnold Lees, MRCS (b.Leeds 1847 - d.Leeds 1921); see Bot.Locality Record Club Rep. 1878-1883, and Naturalist 1878: 97-102, 1900: 229-236.

9 Cooke, G.A. (1818?) Topographical and Statistical Description of the County of Lincoln, &c. Sherwood, Neely & Jones, London, p.46.

10 Seaward, M.R.D. (1965) The Ecology of Twigmoor Warren, North Lincolnshire. M.Sc.thesis. University of Nottingham; see also J.Scunthorpe Mus.Soc., ser. 2, 2: 1-28 (1973).

11 Alternative terms 'flosh', 'fleesh' and 'flodge' are also quoted by Jackson, ibid, p.81.

12 See Trans.Lincs.Nat.Un. 16: 233-234 (1967), Lichenologist 3: 275-276, 5: 423-433, and Goyal, R. (1980) Heavy Metal Uptake in Terricolous Lichens. Ph.D. thesis. University of Bradford.

13 Ratcliffe, D.A., ed. (1977) A Nature Conservation Review. Cambridge University Press, Cambridge.

REPORT OF HON. GENERAL SECRETARY 1980

Both indoor and field meetings have been well supported throughout the year despite the rise in transport costs. A highlight of the winter programme was provided by Dr. Max Hooper giving a lucid and entertaining lecture on "Hedges". The Union has been experimenting with some indoor meetings in venues other than Lincoln on weeknights, and this has so far proved successful. In connection with field meetings it should be noted that we do have Insurance Cover for our members on field meetings. This takes the form of Public Indemnity Insurance, whereby members are covered against negligently damaging a landowner's property.

The Landowner's insurance covers the possibility of the members injuring themselves through his negligence. Our Insurers have indicated that it is time we had a new policy with a higher rate of cover so we are looking at the whole matter again, but in the meanwhile - we are covered.

Insurance was one of a variety of topics discussed by the Executive Committee during its 4 meetings in 1980 but finance and publications figured largely on every agenda.

The financial situation was eased by the raising of the subscription from 1st January 1980, though the Hon. Treasurer has had a little (predictable) difficulty where members' instructions to their banks did not catch up with the increased rate. Miss Eastmead has struggled with these and other complications but we have regretfully to accept that she no longer feels able to continue in the post. We offer her our warmest thanks for her hard work during her period in office.

A further contribution to the easing of the financial situation has been made by the sales of publications. The Hon. Publicity Secretary, who has been responsible for dealing with sales since the last A.G.M. will tell you that the rise in income from sales results from our issue of a new neat price list, but don't you believe it! - she has still had to invoice, pack, despatch and get the cash in - and the Balance Sheet shows how successful she has been.

The major publishing event of 1980 was, of course, the Lichen Flora, overdue because of printing troubles but still, thanks to Dr. Seaward's acceptance of a second year of office, published within his term as President of the Union. The next publication should be the Atlas of Mammals, Reptiles and Amphibians by Maurice Johnson, and this is now at an advanced stage. Towards the end of the year, surprised by the rapidly diminishing stocks of the Geology of Lincolnshire, the Executive Committee investigated the possibility of a reprint. A favourable quotation was received from the printers, accepted by the Committee and the Union now holds another thousand copies for sale.

If I may trespass slightly into 1981, the production of Transactions Vol. XX No. 1 sadly marks the last issue under the editorship of Mrs. Anne Goodall. She has managed the Union's affairs very efficiently for a number of years and will be greatly missed. It is encouraging to think that we have at last caught up in time with Transactions. To stay in line we shall have to get No. 2 out in Autumn 1981. This will tax our financial resources somewhat but will leave us with a less frenzied programme of true annual publications thereafter.

A number of members have contributed material for display purposes and we are beginning to get the work of the Union across to some members of the public through exhibits such as that at the County Show in June 1980. Particular thanks are due to the Director of Museums for making space available in the Museums tent where our exhibit was seen by hundreds of people. At the time of writing by courtesy of the Nottingham Building Society, we have a window display in the Cornhill, Lincoln. The Hon. Publicity Secretary would welcome photographs and other material suitable for display from all sections of the Union, so that further exhibits can be planned for mounting whenever opportunity offers.

The Union, as a member of the Wash Study Group, was invited by the Lincolnshire Planning Officer to a discussion on Reclamation in the Lincolnshire Coast and has currently been invited to comment on the Draft Subject Plan for Development on the Lincolnshire Coast.

I should like to express my thanks to the President for his help and support throughout the year. He agreed to an extended term of

office at very short notice on the understanding that he would seldom be with us in the flesh. In the event he has made strenuous efforts to be present at meetings and the Executive Committee have had his support via the telephone at other times of need, which has been most helpful. May I also thank the other officers and members of the Executive Committee for much help and forbearance during the year, and with them I should mention Mr. Ken Rowland who relieves us of much worry at indoor meetings by taking complete care of projection.

The Officers would also like to record their thanks to Miss Joan Gibbons for donating to the Union a collection of cards including postcards by well-known artists. These have been on sale to members and a sum of £32.60 has been realised for Union funds.

You will shortly be hearing from the Hon. Treasurer/Membership Secretary a rather gloomy report on the current membership position.

I cannot emphasize too strongly that the future survival of the Union lies with you, the membership. We have a good list of saleable publications - but we cannot live on it. Two things are necessary to the survival of the Union: an annual intake of new members greater than the annual loss of members, and a continuing input of records which will stand up to scientific examination. The best publicity is often personal contact. There is so much to be done in recording the wild life of the county as it is, to provide a basis of conservation and management in the future. The ball is in your court. Don't leave it to the Senior Citizens to pick up - they don't have too much time either.

Norah Goom

FIELD SECRETARIES' REPORT

Eleven general field meetings were held in 1980, with an average attendance of 20 members. Northern and southern venues proved equally popular. In response to members' requests, three meetings were held at four sites of aggregate extraction in the south of the county. It was noted that part of two of these are now being used for leisure purposes. Fortunately, the owners of both are interested in nature conservation and are co-operating in developing schemes which minimise environmental disturbance. A third site is used by coarse fishermen, so there are the usual attendant dangers to wildfowl.

Mr Clipson led our first meeting of the year at Tunman Wood on 17th May. Fine weather brought a good attendance of 24 members and 85 species of plants were recorded, the various ferns being of particular interest to botanists. Woodcock, Nightingale, and Garden Warbler were among the many birds seen or heard and good numbers of butterflies were on the wing. A Crested Newt was seen in the water tank among the Common Newts. Members appreciated a delicious tea provided by Mrs Pennell and helpers in her garden at Waddington, to whom our thanks are due.

The traditional "half-term" Botanical Section meeting, led by Miss E.J. Gibbons, was held at Horsington Wood on May 28th, but was marred by heavy rain for most of the afternoon. Dense spruce planting by the Forestry Commission had destroyed the ground flora over a large part of the area, of which the western half had formerly been farm land.

Haxey Railway cutting was the venue on June 1st; 22 members were not put off by the thundery showers that occurred. The Green-winged Orchids were not at their best due to a recent dry period but the Common Milkwort put on a good display. It was a disappointing day for Lepidopterists, the sky being overcast. The Church Hall was used for tea and de-briefing session, with self catering by members.

The meeting at Elsea and Math Wood on June 14th, led by Mr John Redshaw, had the poorest attendance of the year, due no doubt, to torrential rain that morning. The 9 members who braved the elements were rewarded with a fine, if cloudy afternoon. These primary oak/ash woodlands have not been managed for about 50 years, and provided a wide variety of interest. The large field maple trees were a notable feature.

Mr Brian Redman led us round Kirkby-on-Bain pits on July 5th. It was dull and windy producing a poor day for the lepidopterists. This area had supported breeding Common Terns, as wellas Ringed and Little Ringer Plovers, but they appeared to have been disturbed by working machinery, and mention was made of this to the owner.

A moth trapping meeting arranged on the evening of Sunday 20th July at Burwell Woods was not a great success. After torrential rain all day, the evening turned out very clear with moonlight; quite unsuitable for Moths. However, the Twin-spot Carpet turned up in profusion. The 12 members enjoyed an evening walk through the woods.

A meeting was held at Colsterworth on August 2nd, when members were led by Mr David Robinson on a tour of the sites of geological and general natural history interest.

Another fine evening meeting was held at Hartsholme Park in Lincoln led by the Ranger, Mr P. White. He discussed the management plans over coffee and in the Park pointed out notable areas and species including - Spagnum Bog, Royal Fern and Swamp Cypress.

On August 30th, we visited Mr Roger Windley's pits at Tattershall. Our leader, Mrs Irene Weston, showed us a magnificent display of Greater Spearwort and yellow Water Lilies. One pit boasted an association of greater spearwort and purple loosestrife, together with Rosebay and Great Willow-herbs. A professional landscape gardener could not have done better! Dr Fiona Aungier told us about the work that had been done by the Nature Conservancy Council to protect this most attractive area. Regrettably, heavy rain forced this meeting to finish at 4 o'clock.

On September 13th we visited Ancaster Sand Quarry led by Mr E. Clipson and Dr Fiona Aungier when 153 plants were recorded on a fine but windy day. There were 21 members present. Self-catering was again the order of the day at Ancaster Village Hall.

The Fungus Foray, held on October 18th, was as popular as ever, and 35 members were led round Wickenby Wood, by Mr Jack Houghton. They were rewarded by a fine, if cold day, and the collection of 117 species of fungi.

Most of the de-briefing sessions during 1980 were held after self-catering teas, and we wish to thank all those who generously provided on those occasions.

During the winter of 1980/81, 3 indoor meetings were arranged at venues other than Lincoln, in order to bring the LNU to the attention of a wider public. All of these proved successful.

At Grantham, Mrs Irene Weston gave an illustrated lecture on "British Wild Flowers". At Gainsborough we joined the local group of The Lincolnshire and South Humberside Trust for Nature Conservation to hear Mr Geoff Trinder speak on "Wild Life in the Isle of Axholme". At Boston 120 people came to hear Dr James Cadbury (Head of Research, R.S.P.B.) who lectured before showing the film "Who Needs a Wash?"

Our regular venue, Bishop Grosseteste College, was also visited by two excellent speakers. Dr M. Hooper gave an illustrated lecture entitled "Hedges", on which he is a well-known expert. Miss Margaret Wood, of the Society for Promotion of Nature Conservation gave a fascinating account of the work being done regarding "The Conservation of Otters".

As it is not usually possible to provide details of tea arrangements on the summer programme, will members who require this information kindly contact one of us before attending a meeting.

Mary Giles
Violet Wilkin

G E O L O G Y

The following notes, which formed the basis of the section officer's report have been supplied by Mr D.N. Robinson. It can be seen that the section is very active and we are promised further reports in future issues of transactions. Editor

1. Exploratory work on sources of geothermal energy has been undertaken in north Lincolnshire, particularly at Nettleton by the Oxford Heat Flow Group. Results of drilling indicate water at about 100°C at 3Km depth.

2. The proposed Belvoir coalfield underlies a small area of south-west Linconshire (Wyville-Denton-Woolsthorpe-Stenwith) but the nearest mine would be just outside the county boundary at Saltby.

3. British Petroleum has been granted a licence to drill for oil in West Lindsey around Dunholme and Sturton, with a 8000 feet deep well at Scothern.

4. Initial proposals have been made to store Liquified Petroleum Gas at a depth of 300 feet below Killingholme by drilling caverns in the Chalk.

5. It should be noted that there is an on-going programme of research into the stratification and dating of Fenland peat deposits, and it is hoped to secure a note or paper about this for a future issue of Transactions.

6. The conservation of geological sites in Lincolnshire and South Humberside is giving cause for concern. The Claxby Ironstone exposure at Nettleton was lost some years ago; in south-west Lincolnshire the Northampton Sands Ironstone opencast workings have been restored and the unrestored site at Colsterworth (which includes a section of an infilled pre-glacial valley) has recently been lost to refuse landfill (this latter will be the subject of a special report for Transactions). The Lias Clays exposure, including the Paper Shales, at Bracebridge will also disappear under refuse. The long-term future of the Frodingham Ironstone quarries at Scunthorpe must be in question as they approach the economic limit of overburden. The exposure of Carstone and Red Chalk at Red Hill, Goulceby nature reserve has deteriorated markedly due to a combination of weathering and human interference, is distinctly dangerous in parts and will require special protection.

7. Finally, a plea to members to heed Past President Sir Peter Kent's request to report all temporary exposures created by road and river works, ditching and building operations.

B O T A N Y

E. J. Gibbons

A year of poor weather did not encourage botanical search. There were cold winds for most of the spring and summer.

TUNMAN WOOD

The woods have been replanted with conifers but the edges and rides had good remnants of woodland plants. Plants of particular interest that were seen included golden-scaled male fern, lady fern, hard fern, Midland rawthorn, spindle, sand spurrey, wood millett, and three kinds of woodrush, hairy (Luzula pilosa), great (L.sylvatica) and field (L.campestris).

HORSINGTON WOOD

Rain started as we arrived, which was unfortunate. Much of the wood had been replanted, some of it on the farm land adjoining. The old wood had bluebells on the southeast and early purple orchis. On this visit much tormentil was found on the rides, and a large colony of elecampane by the former farmstead. After the rain abated we went to Halstead Wood and Stovin Wood where a few lilies-of-the-valley had survived. Three kinds of Woodrush were recorded, Luzula sylvatica, L. multiflora and L. pilosa.

HAXEY RAILWAY CUTTING

This is now a Reserve managed by the Lincolnshire and South Humber-side Trust for Nature Conservation. The green-winged orchis were a beautiful sight. Other plants in flower included zigzag clover, hemp agrimony, ploughman's spikenard, and plentiful milkwort.

ELSEA WOOD

A nice undisturbed wood with many spring flowers still in blossom due to the late season - primrose, bugle, violets, anemone, woodruff, bluebells, wood sorrel, and ragged-robin. The rare sedge Carex strigosa was found, a new record for the wood.

KIRKBY-ON-BAIN

The first pit was a new one, but sand plants were growing all round, including much smooth cat's-ear and cudweeds. Musk mallow was found growing against a hedge and corn marigold on the banks and in the adjacent field. The second pit was older and had a greater variety with a sedgy pool and willows. Found here were the false cypress sedge, knotted clover, and the alien orange bugloss.

COLSTERWORTH QUARRY

A meeting primarily for Geological features, but many plants were found round the edge, including wild basil, ploughman's spikenard, zigzag clover, hoary ragwort, and the attractive yellow toadflax. The site is planned to be used as a tip but attempts are being made to save it for its geological interest.

HARTSHOLME COUNTRY PARK

This area was full of interest but some of the ferns may have been introduced. Broad buckler fern was abundant. The heathy part had various grasses and the wetter parts had purple and yellow loose-strife. Alder buckthorn was found on the edge of the wood.

LODGE ROAD PITS, TATTERSHALL

The weather was very unpleasant but much of interest was found in the willow thickets and on the former railway banks. The pits here are much more grown over than those seen earlier at Kirkby-on-Bain, and have interesting water plants. The pools had greater spear-wort and a strange looking simple bur-reed, unusual because it was floating. This is a former site for water soldier, frogbit, and the rare fen violet (Viola stagnina).

ANCASTER SAND QUARRY

This is a strange acid soil among the limestone surrounding. The fairly new pits full of water had sand loving plants on the banks above, notably chicory and bristle scirpus. In the nearby wood butter-bur and the grass wood poa were found.

DIVISION RECORDS 1980

	Div.No.	
Anagallis foemina	1	E. J. Gibbons
Cardaria draba	1	V. Pennell
Carex distans	7	
Chenopodium ficifolium	4	E.J.G.
Dryopteris borreri	13	V.P.
Lemna gibba	2	J. Bratton
Lemna polyrhiza	13	V.P.
Mycelis muralis	1	E.J.G.
Polygala serpyllifolia	1	E.J.G.
Ruppia maritima	3	J. Bratton & I. Weston
Sisymbrium orientale	7	E.J.G.

The rare beaked tasselweed (Ruppia maritima) was found in quantity at North Killingholme and has been found since at Donna Nook and North Somercoates.

At Crowle in the Isle of Axholme new places have been found for the rare great yellow rattle (Rhinanthus serotinus) and for marsh andromeda (Andromeda polifolia).

MYCOLOGY

H. J. Houghton

After a reasonably mild winter in 1979/80 the spring was late and cold, so that not many of the larger fungi appeared early in the year. However, morels (Morchella esculenta) were present in the writer's garden and in a nearby spinney in mid-April, and he was presented with a batch of some 40 excellent specimens about the same time which had been gathered just over the border in Yorkshire.

At the first outdoor meeting of the year in Tunman Wood (SK86) specimens from 11 species were collected, mainly off wood, but numerous specimens of Peziza vesiculosa were found on straw bales in the wood. Incubation of rabbit pellets gave 5 more species later, one of which, (Coprinus heptemerus), although apparently common on rabbit pellets, was new to Lincolnshire.

Summer was a mixture of rain and shine, and the larger fungi were present most of the time from June onwards. Miss J. Gibbons showed me several specimens of P. vesiculosa under a large Beech tree in her garden. A good gathering of the St. George's Mushroom (Tricholoma gambosum in mid June, and rabbit pellets produced two more County records in Myxotrichum chartarum and Hypocopra equorum. No doubt aided by the damp conditions Botrytis cinerea, the grey mould, appeared in quantity in the writer's garden on strawberries, and Cyathus striatus, the Bird's Nest fungus appeared on some outdoor plywood usedas edging.

Messrs J. Rowe and K. Rowlands let me have a list of some 19 common species seen at Ancaster Sand Quarry (SK94) at the meeting

on the 13th September, and during the rest of the year until the frosts set in early in November, fruiting bodies were present in quantity. Woodhall Spa and Kirkby Moor, which are both 'well-worked' collecting areas, both produced records of over 100 species, including the small resupinate Basidioradulum orbiculare, one of the Hydnaceae with spines instead of gills. (This had not been recorded in the County since the beginning of the century).

On the 24th August, Mr J. Rowe, Dr J. Marriot (a member of the British Mycological Society) and the writer paid a short visit to Willingham Woods. We came across the all white Lyophyllum connatum in quantity on one of the rides. This is new to the County. Thanks are due to Dr Marriot for identification.

The annual Foray this year was led by the writer, with the assistance of Mr Rowe and Mr Rowlands at Wickenby Wood (TF08) on the 18th October. Conditions were cold and very windy, and wet underfoot, but in spite of this we obtained a list of 117 species. Cortinarius flexipes was new to the County, and a pink plasmodium collected on rotten wood fruited later and was identified by Dr Bruce Ing as Reticularia olivacea, also new to the County. Dr M.R.D. Seaward advised later that he had collected specimens of Corticium evolvens in Tilia and Athelia arachnoidea on the lichen Lecanora conizeaoides - both are new County records. Other fungi collected by a good attendance of members were from a wide variety of groups. The rusts Melampsora capraearum and Puccinia glechomatis were seen on goat willow seedlings and ground ivy respectively, and the pink spored Entoloma prunuloides, which had been found on very odd occasions previously in Lincolnshire, was present. Much photographic material was used on a very find group of fruiting bodies of the green/blue Chlorociboria aeruginascens found on an oak log. A list is available for anyone needing it.

Numerous other specimens or lists of common species have been sent in this year by Dr M.R.D. Seaward, Mrs I. Weston, Mrs K. Rowlands, Mr and Mrs J. Rowe and Miss J. Gibbons, and other members brought specimens to meetings. Mr Rowe sent two specimens of Hebeloma radicosum, which has not been recorded in the County since Sir Henry Hawley's time, before 1910. Mr Rowlands called the writer's attention to fungi growing on his garden and lawns a number of times, including two very large specimens of Agaricus augustus (not recorded in Lincolnshire since 1910) and a forest of the small earth tongue Geoglossum fallax (New to the County). Dr Seaward produced a specimen of G.fallax from Risby Warren a week or two later. Mrs Weston collected Puccinia betonicae on Betony from two locations in the County. It has been recorded once only previously, also by Mrs Weston.

Forays have this year been led for the Gainsborough, Epworth, Barton and Horncastle groups of the Trust, for Scunthorpe Museum Society and three further forays were held in connection with WEA activities. These all produced numerous identifications in various areas, and for useful additions to our records.

The above will serve to show that 1980 has been a 'vintage' year for mycologists. Thanks should be placed on record to a number of eminent mycologists who are always ready with their advice and services for identifications. Miss G.M. Waterhouse, whom we still miss greatly

at our forays, and her colleagues at Kew have identified many of the more difficult species for us. Dr Bruce Ing, of Chester College is always available for the myxomycetes, and Mr R.W. Rayner continues with his ready help and advice in the difficult Lactarius deliciosus/ deterrimus group. Dr J. Marriott was of great help in identifying Lyophyllum connatum and other species from Willingham Forest. We are indeed grateful.

We are at present in the lengthy process of transferring the fungus records to the national grid basis of 10Km. squares, and the old divisional recording has been discontinued, and it is evident that there will be many gaps. It means that there are now some 90 divisions of the County instead of 18, and many squares are empty. ANY specimens will therefore be gratefully received from members - please identify the place where collected.

New Records of Lincolnshire and South Humberside

(1) From the Foray at Wickenby Wood (TF08, VC54) 18.10.80.

Corticium evolvens Fr. On Tilia - Id RBG Kew
Athelia arachniodea on Lecanora conizaeoides - Id RBG Kew
Cortinarius flexipes (Pers. ex Fr.) Fr
Reticularia olivacea (Ehrenbach) Fr. - Id Dr Bruce Ing

(2) From other locations

Coprinus heptemerus (Lange & Smith)	Tunman Wood	SK86
Myxotrichum chartarum	Woodhall Spa	TF26
Hypocopra equorum	Woodhall Spa	TF26
Lyophyllum connatum (Schum ex Fr.) Sing.	Willingham Forest	TF18
Pustularia catinus (Holmsk. ex Fr.) Fuck.	Laughton Forest	(SE80)
Tricholoma flavovirens (Pers. ex Fr.) Lund	-do-	(SK89)
Tricholoma portentosum (Fr.) Quel.	-do-	(SK89)
Geoglossum fallax Durand	N. Hykeham	(SK96)

LICHENOLOGY

M.R.D. Seaward

Mainly as a result of fieldwork undertaken during 1980, particularly in the area around Haxey, the following additions and corrections should be made to the Lichen Flora of Lincolnshire (M.R.D.Seaward, 1980):

Acarospora fuscata (Nyl.) Arnold add 1, 7

Baeomyces rufus (Huds.) Rabent. add 2; new vice-county record (cf. unlocalized record in Lichen Flora, p.8)

Buellia punctata (Hoffm.) Massal. add 1

Caloplaca decipiens (Arnold) Jatta. add 1

C.saxicola (Hoffm.) Nordin. add 1

C.teicholyta (Ach.) Steiner. add 1

Candelariella medians (Nyl.) A.L.Sm. add 1

Catillaria griffithii (Sm.) Malme. add 1

Cladonia furcata (Huds.) Schrad. add 1

C.pocillum (Ach.) O.J. Rich. add 1

C.rangiformis Hoffm. add 1

Evernia prunastri (L.) Ach. delete brackets from div.10

Lecania baeomma (Nyl.) P. James & Laund. Wall of South Ormsby church (div.10), April 1977, J.R. Laundon; new county record (see Trans. Lincs.Nat.Un. 20: 7 - note 28)

Lecanora atra (Huds.) Ach. add 1

L.polytropa (Hoffm.) Rabenh. add 1

L.soralifera (Suza) Räs. add 1

Lecidea tumida Massal. add 1

Lecidella scabra (Tayl.) Hert. & Leuck. add 1

Parmelia glabratula subsp. fuliginosa (Fr.ex Duby) Laund. add 1

Peltigera praetextata (Flörke ex Sommerf.) Zopf. add 12 (H.J.Houghton, March 1964); this cancels out statement "one has not been seen since 1930" in summary of Lichen Flora, p.16.

Physcia tenella (Scop.) DC. add 1, 6

Platismatia glauca (L.) Culb. & C.Culb. add 10 (W.Heath, May 1980)

Protoblastenia rupestris (Scop.) Steiner. add 1, 6, 8

Rhizocarpon obscuratum var. reductum (Th.Fr.) Eitner. add 1

Sarcogyne regularis Körb. add 1

Toninia aromatica (Sm.) Massal. add 1, 7

Trapelia coarctata (Sm.) Choisy. add 1

Usnea inflata Del. On Salix, Baston Fen (div.16), May 1975, E.J. Redshaw; new county record (delete div.16 record for U.subfloridana in Lichen Flora, p.15)

Verrucaria glaucina Ach. add 1, 7

V.hochstetteri Fr. add 1

V.viridula (Schrad.) Ach. add 1

All the above records made by M.R.D. Seaward unless otherwise stated.

CONCHOLOGY - NON MARINE

E. J. Redshaw

Thirty-six new 10 km square records were collected during 1980 by Mrs S. Barker, Mrs V. Wilkin, Mrs A. Goodall and myself. I am grateful to these three ladies for their support, and in particular, to Mrs Wilkin for collecting at all the Union's Field Meetings. Of interest from these meetings was the record obtained by V.W. of the Arion fasciatus segregate from Tunman Wood (SK/885648) and Ena obscura at Burton Wood (SE/867165). The latter species appears to have suffered a contraction in its range, in Lincolnshire, since the 1920s, and now has a very local distribution in old woodland.

The river sampling records of the Anglian Water Authority (Lincoln-shire River Division) were checked for the period 1976-1980, and a further 71 new 10 km records were obtained for the distribution maps. I am grateful to Dr C. Extance, L.R.D. Biologist, for making these records available.

The most important find of the year was of a specimen of Vertigo substriata (Jeffreys) from the Saltfleetby-Theddlethorpe National Nature Reserve. This snail was found by Mrs Barker, and is the first confirmed live record for the county. The record shows in the Atlas of the Non-Marine Mollusca of Britain (1976) for square 54/02 relates to a specimen obtained on the north side of the Humber. The identification of the new record has been confirmed by Mr A. Norris of Leeds City Museum, one of the Conchological Society's referees. The snail was obtained in October 1980 at the edge of a freshwater marsh in the vicinity of sea buckthorn and elder scrub (TF/475915). According to Mr Norris the species is widely distributed in Yorkshire, and in some localities is fairly common and may be obtained by shaking grass roots over a sieve. Generally, however it is a very local species in lowland Britain, and it has previously appeared in Linolnshire records due to its fossil presence in Quarternary deposits in the Scunthorpe area, and two pre 1920 unconfirmed live records.

It is possible that Vertigo substriata may previously have been overlooked due to its small size, as it does not usually exceed 1.75mm in length. However, it is unlikely to be common, and Mrs Barker is to be congratulated on her find.

LEPIDOPTERA

J. H Duddington

BUTTERFLIES

Another disappointing start to the season. The long cold spring delayed the emergence of many species although I did observe the Spring Usher on a snowy day in February resting on Oak boles. On one of the few sunny days in early February a Peacock butterfly was flying on Scotton Common. It had probably hibernated in one of the many rabbit burrows. A sunny period in May brought out some of the early butterflies such as the Orange-tip but they were not prolific in some areas of the County this year.

Small Whites were plentiful, especially during the month of August when numbers may have been increased by immigrants. Other whites such as the Green-veined White, which favours damp areas, had two broods and a partial third. It was an average season for the Large White. Brimstones were scarce in South Humberside where only a few were seen after hibernation in the Spring. Mr R.E.M. Pilcher saw 3 females in April at South Thoresby but none later in the year. They were, however, quite frequent in the South of the County.

One bright spot is the White Admiral which is doing quite well in the Bardney area and has been sighted in other woodlands. Let us hope it continues to do so.

The Peacock continues to flourish and was plentiful on the Buddleias. A late sighting occurred on 29th October. Small Tortoiseshell were about average in numbers, with a late record on 12th November.

The Red Admiral was widespread in Lincolnshire but only odd ones were reported in South Humberside. Numbers may have been higher further south. This has been a good year for Painted Lady; a large migration over the East Coast spread to northern Scotland and in some areas there were exceptional numbers. On the 31st July about fifty were feeding on thistles at Crosby Common, Scunthorpe. Many more were flying in a north-westerly direction. A late record from Horseshoe Point occurred on 12th October.

A Comma was recorded from South Thoresby. This species extended its range in the early fifties to South Humberside but is now rarely recorded in the County and then only in South Lincolnshire.

An L.N.U. Field meeting was held on the 2nd August at Colsterworth. In Glebe Quarry a Marbled White was observed, a species for which we have very few Lincolnshire records. Earlier ones are from the Market Deeping and Stamford areas.

Meadow Brown and Ringlet were about in fair numbers, whereas Wall Brown is now increasing. Only a few were seen from the May brood but they were quite numerous in the summer emergence. A late sighting occurred on 10th October at Pelham.

1980 was a good year for Gatekeeper and Speckled Wood. Numbers were high in many habitats.

Mr R. Johnson and I made our yearly visit to Crowle Waste on the 27th June to observe our only colony of the Large Heath. In the short intervals of sunshine a fair number were on the wing.

It turned out to be a poor year for the Blues. Holly Blue was not seen and Common Blue appeared to be scarce.

Grizzled Skipper and Dingy Skipper were present in small numbers in central and South Lincolnshire. Essex Skipper was rather less common than previously in some of its Boston localities.

This year the Green Hairstreak was found in Holme Wood on the 2nd August. Ova of the Brown Hairstreak were particularly numerous in the Bardney area on Blackthorn in December 1979 and January 1980.

It was very disappointing to find the Greyling missing from its Risby habitat. The signs are that another fine butterfly may be lost to the county.

Concerning the butterflies which have not been recorded for many years, Mr A. E. Smith searched for Chequered Skipper in woodlands in the south west of the county between 27th May and 8th June, and Mr R.E.M. Pilcher, Mr R. Johnson and myself surveyed the central woodlands to support the Monks Wood Mapping scheme. We did not find a single specimen.

There is still the continued absence of records for fritillaries although some of the woodland rides look suitable for these attractive butterflies.

The Chalkhill Blue has not been seen in its only known Lincolnshire locality and no Brown Argus have been reported. Let us hope they will again soon be seen in our County.

MOTHS

There has been a marked scarcity of moths this season. Many species turned up, but numbers were well below average. 'Sugaring' was very disappointing and on some nights not one moth was attracted to the patches. This was no doubt due to the easterly winds which were only too frequent this year.

Mercury vapour lights were also affected, but in late July and August several nights with warm thundery conditions attracted large numbers to the sheet. It is said that there are about four really good moth nights in a season which means having the light on every night so as not to miss them! Lepidopterists reported that beating for larvae in the Spring was productive.

All was not gloom and we have two new County Records. Mr A. E. Smith captured a Waved Black (Parascotia fuliginaria) at Boston. About 20 years ago it was a great rarity and also little known on the continent. British specimens were taken in the London docks, the larvae feeding on fungus such as Polysticus versicolor, Daldinia concentra and Polyporus schweinitzii which were growing on the rotting wood of old buildings and wharves. The moth hides in crevices and the cocoon hangs like a hammock attached at the two ends by silken threads making

it very difficult to see. The species is now found in Surrey and East Berkshire.

On the 27th July Mr R. Johnson and I were observing the Large Heath on Crowle Waste when I netted a small moth flushed out of cotton-grass. It was the Purple-bordered Wave, a very local marsh loving species found on moorland and wet heaths. It occurs principally in Norfolk and Westmorland. The form captured was the purple one which is found at Witherslack. It is said to fly more freely at sunrise.

The year was not good for migrant Hawk Moths, the only record received being from Mr R.E.M. Pilcher. Two Convolvulus Hawks were observed in his garden at South Thoresby.

Several Death's Head Hawks were taken to the Scunthorpe Museum in a tatty condition after being caught by cats. They have not been officially recorded as several other lepidopterists and myself have been breeding the species from ova and many were released. Eyed Hawk were quite plentiful in all stages in South Humberside but the Elephant Hawk has been scarce. I found only one larva. The Lime Hawk was recorded from Boston, Lincoln and Scunthorpe.

A new County record in 1979, the Dotted Rustic, has again turned up. Mr M. Townsend took one in Lincoln on 16th August. The species may be extending its range. It occurs in Dorset, Gloucestershire, Cumberland and Scotland.

Other species of interest

Small Chocolate tip (Clostera pigra) 28th May on Scotton Common (J.H.D.)
Oak Eggar (Laslocampa quercus) 20th July at Burwell Wood and Fiskerton (LNU E.M.)
Lappet (Gastropacha quercifolia) 12th August, at Covenham St Mary (K.W.)
Marbled Oak (Sarrothripus nevayana) in Bardney Woods (M.T.)
Oak Beauty (Biston strataria) in Bardney Woods (M.T.)
Double Lobed (Apamea secalis) at Fiskerton in July; Dunholme (M.T. K.S.)
Dingy Shears (Apamea ypsillon) at Fiskerton in July; Dunholme (M.T.)
Varied Coronet (Hadena compta) at Boston, Lincoln & South Thoresby (A.E.S., M.T., R.E.M.P.)
Wood Tiger (Parasemia plantaginis) in June at Epworth Turbary (J.T.)
Alder Dagger (Apatcle alni) at South Thoresby (R.E.M.P.)
Broad-barred White (Hadena sepena) in June at Scunthorpe (J.H.D.)
Red Underwing (Catocola nupta) 20th September and 2nd October at Laughton (R.J.)
Scarce Silver lines (Pseudoips prasinana) on 26th July at Normanby le Wold (D.B.)
Leopard (Zeuzera pyrina) on 26th July at Normanby le Wold (D.B.)
Orange Underwing (Brephos parthenias) between 30th March and 15th April at Scotton, Laughton and Marton (J.H.D.)
Lesser Spotted Pinion (Cosmia affinis) on 14th June at Elsea Wood (R.G.)
Sprawler (Brachyonycha sphinx) in Bardney woodlands (J.H.D.)
Marsh Moth (Hydrillula palustris) at Gibraltar Point (R.E.M.P.)
Tawny Pinion (Lithophane semibrummea) at South Thoresby (R.E.M.P.)
Feathered Ranunculus (Eumichtis lichenia) abundant along coast(R.E.M.P.)
Emperor (Saturnia pavonia) in August larvae at Bird's Wood (E.E.)

In concluding my report I should like to thank all members who have sent me their observations during the year, particularly Mr A. E. Smith, Mr R.E.M. Pilcher, Mr R. Johnson, Mr M. Townsend, Mrs A. Goodall, Mr F. Brazier, Mr E. Mason, David Brant, Mr K. Saville, Mr K. Wilson, Mr J. Trinder.

VERTEBRATE ZOOLOGY

M. Johnson

This year the highlight in our mammal records was the reappearance of a Yellow-necked mouse (Apodemus flavicollis) on the Gibraltar Point nature reserve, reported by the warden Mr R. Lambert. A number of yellow-necked mice has been trapped in and around the Gibraltar Point Field Research Station in the past, the last record being of one caught by Mr F. Norris in 1956. The latest record is of a specimen described by the warden as "excellent" with a clearly defined collar marking that had developed into a cross on the chest. It is a great pity that none of these specimens have ever been sent in to the museum at Lincoln for preservation.

Domestic cats often catch small mammals and provide us with many valuable records. This year, however, I received a record of one mole that caught a cat. It appears that the cat which has become quite an expert at catching moles on its owner's lawn was about to claim yet another victim when the mole snapped its jaws onto the cat's ear and hung on. After a time the cat managed to shake off the mole which quickly dug itself back into the ground and escaped.

Harvest mouse records continue to come in from various parts of the county and I have again received several that were trapped indoors during the winter. One harvest mouse which was found dead in a garage after it had accidentally become trapped in a plastic bucket, was kindly sent to me by Mr T. Smith of Boston.

Hedgehogs were active until at least the 28th November when the last fresh road victim was recorded. One that emerged in January was also recorded by Miss N. Goom. Other records from Miss N. Goom include a stoat found dead on the road near the High Dyke Spitalgate roundabout, and a second stoat which was seen at the Witham Outfall. The second stoat, which was very much alive, was being harried by a Turnstone, an Oystercatcher and two Black-headed Gulls, subsequently swam across the river to the north shore mobbed by six more Black-headed Gulls.

Two feral ferrets were seen on Kirkby Moor and a third was found dead on Roughton Moor. The first bat records of the season were provided by Mr P.J. Wilson who observed pipistrelles flying in March near Legsby. On July 31st I observed Noctule, Pipistrelle and Whiskered bats flying around a street light in Reepham Village. The identifications were made with the aid of a bat detector.

REPTILIA & AMPHIBIA

Frogs and common toads were reported from various ponds inland

and near the coast and the natterjack toad was reported to have had a good breeding season in its coastal habitat. Crested newts were reported from Tunman Wood. Grass snakes were seen at Bardney, West Ashby, and Kirkby Moor; Adders and common lizards were again reported from Scotton Common, and Kirkby Moor.

ORNITHOLOGY

E.J. Garlick & P.J. Wilson

As usual field meetings were held monthly throughout the year. In January twenty members spent a day at Rutland Water where 54 species were recorded, including 11 species of duck. In February the venue was Alkborough Flats on a dull and misty day with very poor visibility. The summer programme included two coastal meetings; in early May a most interesting day was spent at Saltfleetby with Mr T. Clifford, the National nature Reserve warden, who discussed the survey work going on, especially on the birds using the fresh water marsh area. Sightings that day included a Wryneck. Also in May, Epworth Turbary was re-visited with Mr G. Trinder, the reserve manager. Much work has been carried out since the sections' breeding bird survey in 1977. The open area has been extended and a pool and hide constructed. Long-eared and Tawny Owl, and Teal were nesting. The evening meeting in June was very ably led by Peter Corringham at Cottam power station settling pits on Trentside, where 41 species were recorded on the pits and adjacent fields. At the first of the autumn meetings in October at Huttoft Bank heavy rain and mist made sea watching impossible, and the Sea Bank Clay pits appeared empty of birds save for a flock of Pochard on Chapel Pit. In September we were at the Welland Outfall for high tide in the early morning. In November at low tide, Wrangle Marsh was full of interest including large flocks of Twite feeding on the sea aster, a glimpse of a Moorhen, a bird not often seen on the marsh, and very good close up views of a Short-eared Owl quartering the marsh for prey. Later a visit was made to the long established Long-eared Owl roost in a high hawthorn hedge bordering the Hobhole Drain where at least 12 were counted, visibility being good in the afternoon light.

The summer survey from April to July was of the breeding birds of Wilsford Quarry. Members also took part in three B.T.O. surveys - Nightingale, a sample survey of Rookeries and a sample summer waterfowl census. The results of these surveys are reported elsewhere in this volume.

Records received included up to 24 Dotterel present on Bourne Fen from 10th to 16th May, and a similar number on the borders of the Isle of Axholme during the same period. These are the largest numbers recorded in the county since 1959. In central Lincolnshire a Hobby was seen with young on the wing in August. A Dipper was present at Riseholme in December, and Blackcaps were recorded in early January.

The Wash wildfowl counts showed that there has been a steady increase over the last few years in Pink-footed Geese - over 2,000 were present in January on Holbeach Marsh (305 in 1978; 1,400 in 1979).

Total Brent Geese numbers over 7,000 in January was much as in 1979, as wasthe Shelduck count of 12,000+. Teal 310 (150); Mallard 620 (230); Pintail 350 (24); and Goldeneye 89 (7) numbers were up (1979 figures in brackets),but Wigeon 1,000 (4,000) decreased. The January wader counts showed an increase in Golden Plover 280 (160) and Turnstone 200 (25), but Knot 9,500 (13,000) and Bar-tailed Godwit 3,300 (7,800) showed a marked decrease. Other wader numbers were much the same as in recent years, and about 3,000 Twite were again recorded on the salt marshes.

WILSFORD QUARRY BREEDING BIRD SURVEY 1980

Map Reference SK 986415

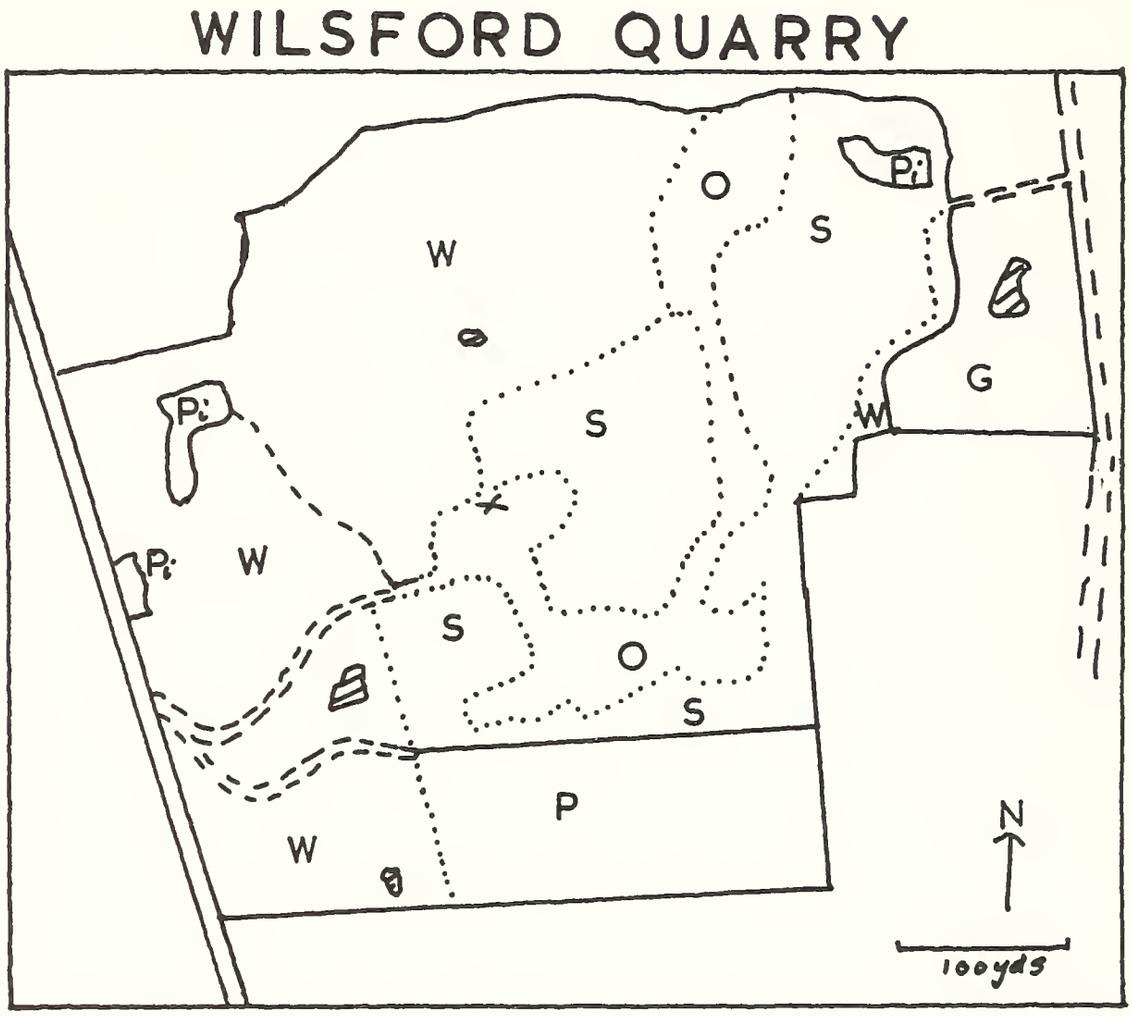
At the request of the owner, Mr B.E.N. Lyte, the Ornithological Section carried out a breeding bird survey of Wilsford Quarry during the summer of 1980. The quarry is situated about 1½ miles south of Ancaster on the Lincolnshire Limestone. The area surveyed was approximately 40 acres. The quarry has long been disused. About half is now mature woodland which has developed on old spoil heaps including some sheer cliffs entirely shaded by trees, and some damp hollows which held water permanently throughout the summer. The woodland is of oak and ash with an understorey of mature hawthorn, and at the west end, some areas of beech. The area above the site of the former cottage is dominated by a few mature pines and larches. The old garden has exotic shrub species. The other half of the site is partly hawthorn scrub and partly open grassland with much exposed rock face and bare quarry floor. On the south side is a recently ploughed rectangular field of approximately 5 acres surrounded by a well developed hawthorn and blackthorn hedge. At the east end is a small field with a marsh depression and a pond surrounded by post and wire fence with a belt of well grown saplings of elm, ash and oak on the quarry side. The site thus exhibits a good variety of habitats, from mature and decaying trees, affording ample opportunity for hole-nesting birds, through woodland edge to scrub zone, grassland and open water. The whole is surrounded by arable land.

Seven visits were made to the site between late April and early July. Eight people regularly took part in the survey with extra help from others on several occasions. The method of survey used was that recommended for the British Trust for Ornithology Common Bird Census. Registrations of territory holding males, of nest sites and broods were plotted on maps of scale 1:2500 (approximately 25" to 1 mile).

Forty nine species were recorded on the reserve; forty-three of them were birds holding territory. The species and number of territories recorded are shown on the table below.

Census work this year was hampered by the wet, dull, cold and often windy weather. The site was undoubtedly grossly under-recorded,

birds often remaining silent and out of sight. The low number of registrations of a bird such as the Blue Tit, which normally makes its presence known as soon as one enters its territory, were due to the weather conditions. There were probably 20 Blue Tit territories; 10 were well substantiated, the rest having 3 or fewer good registrations.



W=Woodland

S=Scrub

G=Grassland

P=Ploughed & seeded

O=Open

Pi=Deep pits

=Ponds

X=Site of former house

BREEDING BIRDS of WILSFORD QUARRY

Number of territories recorded - figures in brackets indicate probable total number of pairs.

Habitat - W = Woodland; E - Woodland Edge; S = Scrub; G = Grassland

SPECIES		HABITAT
Red-legged Partridge	2	S
Grey partridge	1	S
Pheasant	4	E
Moorhen	1	G
Woodpigeon	?	W
Turtle Dove	9(11)	E
Green Woodpecker	1	W
Great Spotted Woodpecker	1	W
Skylark	1	G
Meadow Pipit	1	G
Pied Wagtail	1	G
Wren	22	W
Dunnock	8(14)	W,E
Robin	14	W,E
Blackbird	24	W,E,S
Song Thrush	14(17)	W,E,S
Mistle Thrush	(1)	E
Lesser Whitethroat	1	E
Whitethroat	2	S
Garden Warbler	4	E
Blackcap	8	W,E
Chiff-chaff	4(7)	W
Willow Warbler	23(25)	E,S
Spotted Flycatcher	4	E
Long-tailed Tit	3	E,S
Willow Tit	1	W
Coal Tit	1	W
Blue Tit	10(20)	W,E
Great Tit	9	W
Tree-creeper	2	W
Jay	1	W
Magpie	1	W
Jackdaw	(1)	E
Carrion Crow	(1)	W
Starling	?	W
House Sparrow	?	
Tree Sparrow	14	W
Chaffinch	15	W,E,S
Greenfinch	9	E
Linnet	4(6)	S
Lesser Redpoll	5	W,E
Bullfinch	4	W
Yellowhammer	8	S

Other Species recorded on the Reserve

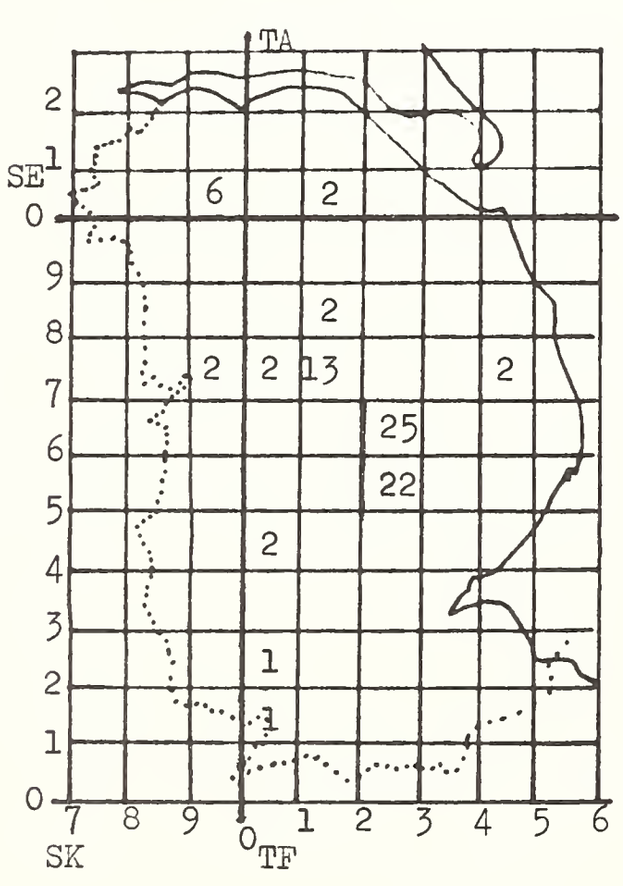
Mallard	Collared Dove
Kestrel	Cuckoo
Lapwing	Goldfinch

NIGHTINGALE SURVEY

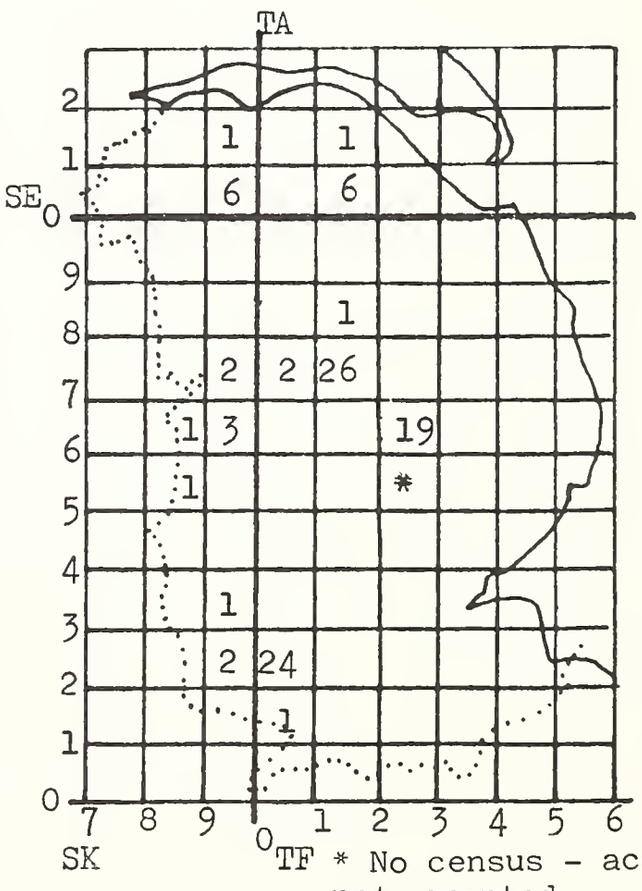
	1980	1976	Area
SE 90	6	6	Twigmoor Woods & Black Walk Nook
SE 91	1	0	Far Wood
TA 10	6	2	Hendale Wood, Mausoleum Woods & Caen Hill
TA 11	1	0	Mausoleum Wood (north end)
SK 85	1	0	Stapleford Wood
SK 86	1	0	Eagle Hall Great Low Wood
SK 92	2	0	Twyford Forest
SK 93	1	0	Ropsley Rise Wood
SK 96	3	0	Hartsholme Park & Cinder Plot
SK 97	2	2	Canwick & South Cliff Golf Course
TF 01	1	1	Newell Wood
TF 02	24	1	Auster Wood, Bourne Wood, Temple Wood, Callan's Lane Wood, Pasture Wood & Thorney Wood
TF 04	0	2	Aswarby Thorns
TF 07	2	2	Newball Wood
TF 17	26	13	Austacre Wood, College Wood, Great Scrubb's Wood, North Spring Wood, Minting Park, Minting Wood Scotgrove Wood & New Park Wood
TF 18	1	2	Eleanor Wood
TF 25	0	22	Troy Wood & St. Helen's Wood
TF 26	19	25	Bracken Wood, Woodhall Golf Course & Kirkby Moor
TF 47	0	2	Welton & Willoughby Woods

This survey was part of a B.T.O. National Census. The maps and table show the comparison with the 1976 data for Lincolnshire and South Humberside. The total number recorded in 1976 was 80 and in 1980 the total was 97. This increase is in line with the emerging national picture. We are grateful to the observers who took part in this demanding survey.

1976



1980



* No census - access not granted

WILDFOWL COUNT. Summer population and breeding census on sample waters

This survey was part of one conducted nationally to estimate the effect of recreational activities on the hatching and rearing of waterfowl. No estimate of the effects of disturbance can be included here since this needs to be compared with the complete national data. Ten waters were censused between March and August 1980. The table below shows the wildfowl present on each site. The numerator indicates the maximum number of birds present at any one count, the denominator shows the number of broods recorded.

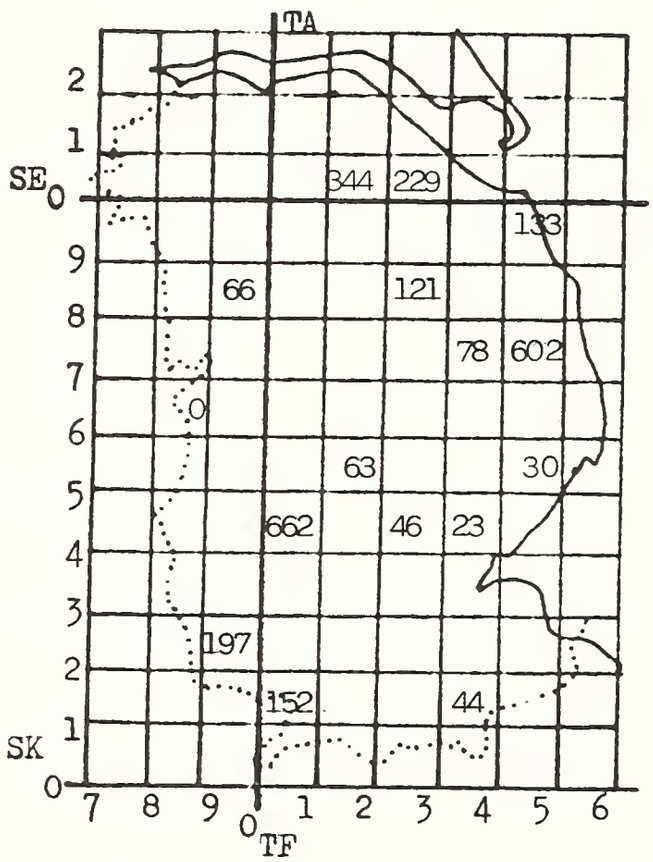
The non-breeding duck included Pintail, Teal and Shelduck at Baston Fen in March and April only. Goosander was recorded at Grimsthorpe only in March and at Denton in April. The pair of Egyptian Geese arrived at Grimsthorpe Lake in March and nested in an Oak tree. Four of the eight eggs were hatched under a broody hen and released on to the lakeside. The female brooded the remaining four eggs, hatched them but had lost the young ten days later.

	Croxby Ponds TF 19	Hartsholme Lake SK 96	S.Common Pond Lincoln SK 96	Branston Hall Lake SK 96	Mere Hall Lake SK 96	Denton Reservoir SK 83	Culverthorpe Lake TF 03	Grimsthorpe Lake TF 02	Baston Fen TF 11	Langtoft Pits TF 11
Little Grebe	2/0			1/0				4/1	2/2	
Great Crested Grebe	6/1	5/1		1/0		10/4	5/1	5/2	1/0	5/2
Mute Swan		3/0					4/0	7/0	3/0	4/1
Greylag Goose						3/0		43/6		5/2
Canada Goose	9/0	2/1				11/0		239/18	3/0	28/5
Egyptian Goose								2/1		
Shelduck									2/0	
Teal								11/0	40/0	
Mallard	26/2	13/2	1/1	5/2	14/5	15/3	27/3	123/4	81/3	65/1
Pintail									2/0	
Garganey									2/1	
Shoveler							2/0	3/0	18/0	
Pochard	2/0							33/0		
Tufted Duck	4/1	13/0			2/1	16/0		49/5	24/2	49/1
Goosander						4/0		11/0		
Moorhen	8/1	3/2		4/0	2/1	4/2	1/0	34/5		
Coot	24/2	19/0		4/0	4/2	22/1	2/1	68/5		

ROOK SURVEY

10 km. squares in Lincolnshire which were selected in the B.T.O. National Sample Census of Rookeries

10km.squ.	Area	No. Nests	Trees-predominant trees in capitals
TA 10	Great Limber	344	ASH, Beech
TA 20	Barnoldby	229	ASH, Beech, Sycamore, Oak
SK 86	Swinderby	0	
SK 92	Colsterworth	197	ASH, H.Chestnut, Beech, Oak, Pine
SK 98	Ingham	66	BEECH, Ash, H.Chestnut
TF 01	Witham on the Hill	152	ASH, Pine, Syc., Poplar, H.Chest., Elm
TF 04	Sleaford	662	ELM, Beech, Ash, Syc., Oak, H.Chest., Pine
TF 15	Billinghay	63	ELM, H.Chest., Beech, Oak
TF 24	Swineshead	46	ELM, Ash
TF 28	Burgh on Bain	121	SYCAMORE, Ash, H.Chest., Elm, Poplar
TF 31	Whaplode Fen	44	H.CHESTNUT, Sycamore
TF 34	Boston	23	ELM
TF 37	Tetford	78	SYCAMORE, ASH, Beech, Elm
TF 45	Friskney	30	ELM, Sycamore
TF 47	Alford	602	ASH, Sycamore
TF 49	Somercotes	133	ELM, Ash, Beech, Syc., H.Chest., Pine



RINGING REPORT 1979

The County total was almost double that of last year. It appears that most of the thirty three individuals or groups of ringers concerned increased their efforts to achieve this excellent result.

Most species showed the proportional increase that might be expected in view of the grand total but Warblers were well in excess of

double last year's numbers. Swallows and Starlings also showed large increases. It was an exceptionally good year for Firecrests with a total of 19.

Despite the increase of ringing activity in scrub and woodland, one species caught in smaller numbers than expected was Redpoll. As a single ringer can have a dramatic effect on a species total by making a sustained effort, it is always dangerous to draw conclusions from county results, but national totals over the last 3 years have also shown a marked drop in Redpoll number. In 1977 there were 14,163 Redpolls ringed. In 1978 the number dropped to 6,024 and in 1979 it was 5,945. It may be that the species is now declining after the rapid growth of the last few years.

Among scarcer birds, a Sardinian Warbler, which was a County 'first', must take pride of place. It was ringed and then re-trapped twice at Gibraltar Point. Other notable birds include Bluethroat, Marsh Warbler, Pallas's Warbler, Yellow-browed Warblers, Red-breasted Flycatcher, Great Grey Shrike and Red-backed Shrike.

G. P. Shaw

Species	Gibraltar Point Total	Lincolnshire Total
Little Grebe		1
Grey Herron		30
Wigeon		1
Gadwall		1
Teal		22
Mallard		588
Shoveler		3
Pochard		1
Tufted Duck		53
Sparrowhawk		2
Kestrel	3	12
Red-legged Partridge	4	6
Pheasant	2	2
Moorhen	1	17
Coot		35
Oystercatcher		96
Little Ringed Plover		8
Ringed Plover	37	43
Grey Plover	1	23
Lapwing		7
Knot		91
Curlew Sandpiper	1	1
Dunlin	28	871
Ruff		2
Jack Snipe	4	4
Common Snipe	3	20
Woodcock	5	12
Bar-tailed Godwit		18
Curlew	1	8
Redshank		175
Greenshank		1
Green Sandpiper		1
Common Sandpiper		4

Species	Gibraltar Point Total	Lincolnshire Total
Turnstone		71
Black-headed Gull		920
Common Gull		22
Sandwich Tern		1
Common Tern		73
Little Tern	18	18
Stock Dove	5	13
Woodpigeon	11	35
Collared Dove		19
Turtle Drove	6	28
Cuckoo	6	12
Barn Owl		2
Little Owl		11
Tawny Owl		11
Long-eared Owl	4	9
Short-eared Owl		2
Swift		2
Kingfisher		3
Wryneck		1
Green Woodpecker	1	4
Great Spotted Woodpecker		3
Skylark	214	232
Sand Martin		179
Swallow	220	1,901
House Martin	3	39
Tree Pipit	1	11
Meadow Pipit	81	129
Rock Pipit		1
Yellow Wagtail	3	13
Pied Wagtail		99
Wren	38	254
Dunnock	543	1,659
Robin	232	1,198
Nightingale	1	7
Bluethroat	1	2
Black Redstart	1	1
Redstart	18	59
Whinchat	17	18
Wheatear	8	13
Ring Ouzel	7	10
Blackbird	610	3,190
Fieldfare	177	220
Song Thrush	331	1,325
Redwing	254	420
Mistle Thrush	9	31
Grasshopper Warbler	8	34
Sedge Warbler	113	368
Marsh Warbler		2
Reed Warbler	87	504
Sardinian Warbler	1	1
Barred Warbler		4
Lesser Whitethroat	141	316

Species	Gibraltar Point Total	Lincolnshire Total
Whitethroat	346	809
Garden Warbler	61	207
Blackcap	238	683
Pallas's Warbler		1
Yellow-browed Warbler	1	2
Wood Warbler	4	4
Chiffchaff	41	138
Willow Warbler	722	1,798
Goldcrest	30	224
Firecrest	9	19
Spotted Flycatcher	18	73
Red-breasted Flycatcher		1
Pied Flycatcher	14	51
Long-tailed Tit		182
Marsh Tit		19
Willow Tit	2	94
Coal Tit	4	105
Blue Tit	223	1,943
Great Tit	46	744
Treecreeper		32
Red-backed Shrike	1	3
Great Grey Shrike		1
Jay		12
Magpie	8	9
Jackdaw		12
Rook		119
Starling	294	5,508
House Sparrow	156	417
Tree Sparrow	154	581
Chaffinch	101	526
Brambling	68	206
Greenfinch	394	2,268
Goldfinch	161	341
Siskin	4	15
Linnet	195	721
Twite		94
Redpoll	185	608
Bullfinch	32	395
Hawfinch		1
Yellowhammer	48	271
Reed Bunting	124	449
Corn Bunting	1	7
Totals:-	6,944	35,352
Species:-	76	127

WOOD ANEMONE IN CENTRAL LINCOLNSHIRE: AN ANCIENT WOODLAND INDICATOR?

by

G.F. Peterken

INTRODUCTION

Several writers have claimed that particular plant species are indicators of ancient woodland, i.e., that these species are more or less confined to those woodlands which have existed since at least the Middle Ages. For example, Sir Hugh Beevor (1925) thought that bluebells picked out by their presence those woods in Norfolk which were the modern remnants of the early medieval woodlands. More recently, Dr. Francis Rose (1976) has established that in lowland Britain many epiphytic lichens are more or less confined to ancient woods where elderly trees have been present continuously through the historical period.

Intriguing though these claims are, they have rarely been supported by the necessary proof. Proof if available would take the general form of a survey of the distribution of the claimed indicator species, an independent investigation of the history of the woods in the same area, and a significant bias in the incidence of the species to ancient woods. Accordingly, in an attempt to identify and prove the existence of ancient woodland indicators, I have collected floristic and historical data on the woods and woodland plants of central Lincolnshire. In this article I describe the distribution of Anemone nemorosa and interpret it in terms of woodland history.

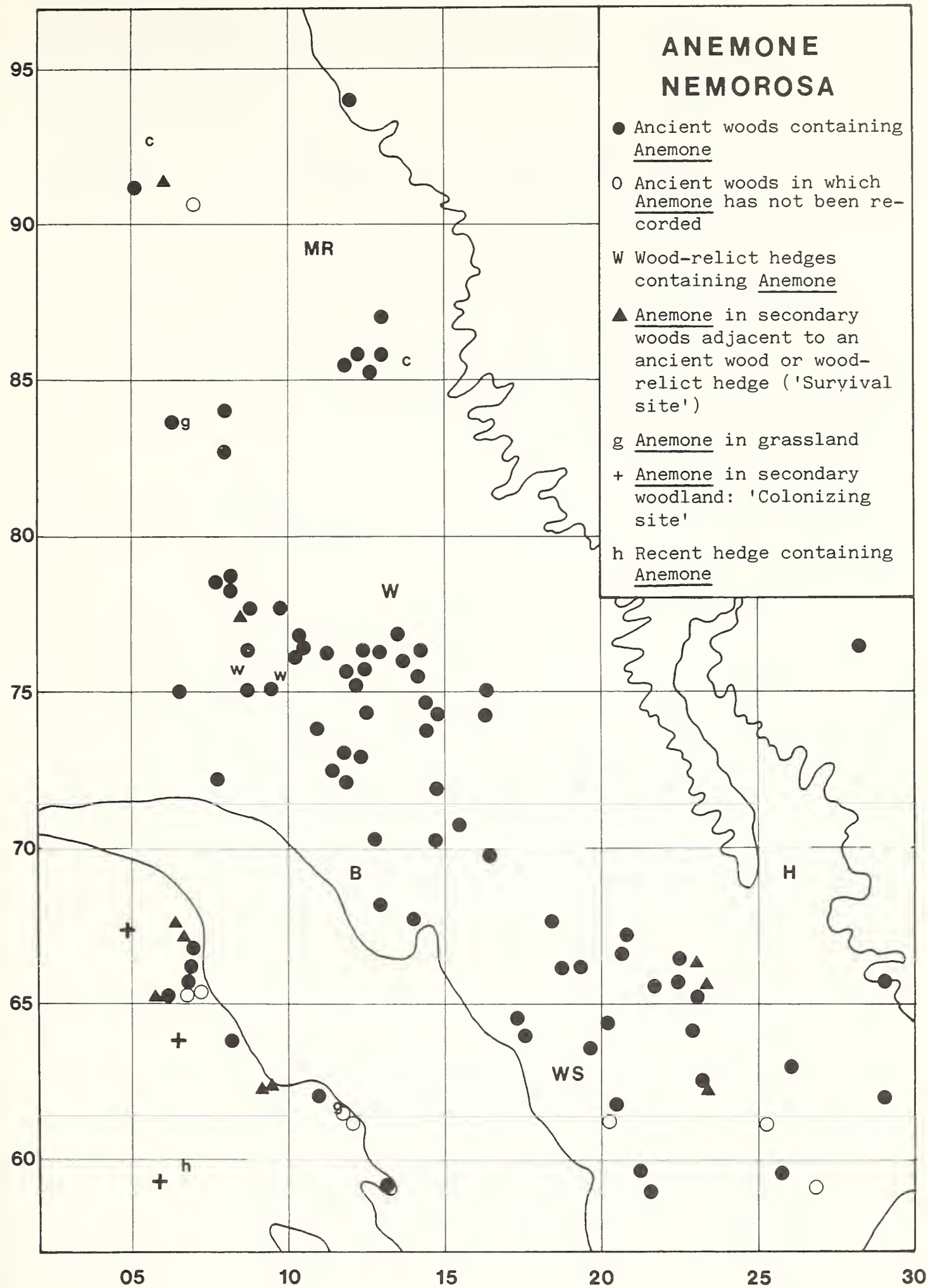
DISTRIBUTION IN RELATION TO HABITAT AND SOILS

Since 1970, when this survey began, we have found Anemone in 101 locations within the study area. In some localities, e.g., parts of Stainfield Woods, countless millions of plants dominate the ground vegetation, where in others Anemone occurs only as a tiny patch. Ninety-four of these localities are in woodlands, the residue being in hedges (3) and grassland (4): clearly the species fully justifies its common name of 'wood' anemone. Within the woods Anemone grows mainly on poorly drained, acid (pH≤5.5) soils, but its edaphic range is remarkably wide. It has been found on alkaline soils up to pH 7.9 in Thornton Wood and on light, strongly acid (pH 3.8) loams in Newball and Stainfield woods. Although it grows mainly on medium-textured soils, it has been found both on loamy sand and very poorly drained clay in Hardy Gang Wood and elsewhere. Drainage too is not by itself a limiting factor, for Anemone can grow on both very poorly drained and freely drained soils. In fact, it is very difficult to identify soil types on which Anemone is incapable of growing.

We can therefore characterise Anemone in traditional terms as a woodland herb which is tolerant of a wide range of soils. However, most woods contain no Anemone at all even though the soil appears to be suitable. We must obviously look for other limiting factors.

DISTRIBUTION IN RELATION TO HABITAT HISTORY

Ancient woods have been identified by means of historical records,



The distribution of wood anemone in central Lincolnshire. The National Grid is shown as 5 km squares. Continuous lines define approximately the scarp of the Wolds across the north-east and the peats of the Witham Fens towards the south. The locations of Bardney (B), Horncastle (H), Market Rasen (MR), Woodhall Spa (WS) and Wragby (W) are given.

old maps, field survey of artefacts such as boundary banks and cultivation remains, and topographical analysis of such features as the parish land use layout and the pattern of inclosure. Eighty-nine ancient woods survive in the study area, the largest being Fulsby Wood, the smallest being tiny fragments of the now-reduced Blankney Wood on the Carr Dyke bank. Together they cover 2558 ha, or 43% by area of all woodland. The majority 57% of woodland is recent secondary, i.e., it grew up naturally or was planted on formerly unwooded ground less than 400 years ago.

If Anemone were randomly distributed through all the woodland irrespective of its history, we might expect roughly 43% of the 94 woodland localities to be in ancient woods, i.e., 40. In fact, 81 localities are in ancient woods and only 13 are in recent secondary woods, a highly significant bias to ancient woodland. The great rarity of Anemone in secondary woodland suggests that this species has been unable to colonize this apparently suitable habitat even though it has been available for up to 400 years.

Further evidence of Anemone's limited colonizing ability comes from the distribution of the 20 localities outside ancient woods. These can be divided into three groups, survival sites, colonizing sites and introductions:

(i) Survival Sites. These are localities where Anemone could have survived since the time when the present habitat was part of, or linked to, ancient woodland on that site. Fourteen localities appear to be survival sites. Two are in wood-relict hedges, i.e., the surviving margins of ancient woods which have been cleared for agriculture. Both are near Newball Wood, where hedges mark the former boundaries of the vanished Ridings Wood and the reduced Gatecliff Wood. Ten localities are in secondary woods which are either touching ancient woods containing Anemone (e.g., Ash Holt next to White Hall Wood; Kingerby Belt next to Kingerby Wood), or touching wood-relict hedges which might have provided refuges for Anemone (e.g., at Metheringham Barff). Two localities are in grassland, one on the site of former ancient woodland at Blankney, the other formerly in a hay meadow beside Shaft Wood.

(ii) Colonizing Sites. These are localities where Anemone could not have survived on or near the present site, usually because the ground has been cultivated in the past, and the modern habitat has had no known direct connection with ancient woodland or a wood-relict hedge. Four localities appear to meet these criteria, three in secondary woods (e.g., Blankney Long Wood) and one in a recent hedge at Blankney.

(iii) Introductions. Localities established by planting or sowing. Anemone grows in the churchyards at Legsby and Kingerby, where it is concentrated on particular graves. Although one cannot be sure, this is likely to be evidence, not of long-distance colonization from a distant wood, but of fond remembrance for a lost relative.

We conclude that of the 101 localities, 95 are in ancient woods or linked directly to them by either survival in a hedge formed from an ancient wood or spread into adjacent secondary woodland. Only 4 localities appear to have arisen by dispersal and establishment across

hostile territory into habitats which have been completely isolated from ancient woods.

DISCUSSION

First, we can consider the original question: *Anemone* is indeed an excellent ancient woodland indicator. We should however, note that it is not much good as an aid to landscape historians, because we have already had to identify the ancient woods from historical sources in order to demonstrate this fact! Furthermore, this conclusion applies only to central Lincolnshire: *Anemone* may be a good indicator elsewhere, but it would be risky to assume that it is.

What factor prevents *Anemone* from spreading? Since all ancient woods have been coppices and most secondary woods have been treated as high forest, one might suspect differences in management. This however, is unlikely to be important, for *Anemone* shows no preference for the few secondary woods which have been coppices, and seems to thrive in the ancient woods where the coppice has been promoted by neglect into a form of high forest. Soil differences provide a possibility. Many secondary woods have grown up on formerly cultivated ground where the soil is now better drained, more alkaline, richer in nitrate and phosphate and (because of ploughing) less sandy in the surface horizons than the ancient woodland soils nearby. The suitability or otherwise of secondary woodland soils to *Anemone* should be tested experimentally, but subject to such experiments it seems unlikely that soil factors exclude *Anemone* directly. Rather, the soils of secondary woods seem to encourage the growth of rampant ground vegetation against which *Anemone* may be unable to compete. Soil factors acting directly or indirectly cannot be the full explanation: after all, *Anemone* is present in a few secondary woods with a vigorous herb layer and absent from other secondary woods with apparently suitable soils and a sparse herb layer. One therefore suspects that some part of the process of dispersal and establishment is inefficient: *Anemone* seems capable of spreading from ancient woods into adjacent secondary woods, but unable to make the jump across cultivated ground to isolated secondary woods.

The origin of ancient woods is unknown, but there is a reasonable chance that they are surviving fragments of primeval woodland which were never cleared, but were instead retained and treated for centuries as coppice. If so, then *Anemone* must have been a widespread species in the original natural woodland which once covered central Lincolnshire. When this woodland was fragmented by clearance (Ancient woods now cover about 2% of the land surface in the study area.) *Anemone* continued to thrive in the remnants. Opportunities to recover lost ground came with the post-medieval reorganisation of the landscape, when numerous hedges, shelterbelts and game coverts were created, but *Anemone* virtually failed to respond. Most at home in a habitat which naturally covered the entire land surface, within which long-distance spread was possible in time by an accumulation of very small jumps, *Anemone* appears to have little or no means of long-distance dispersal across hostile territory, though it managed to spread into secondary woods which happened to arise on ground beside ancient woods. Furthermore, if any *Anemone* fruit had been dispersed to an isolated secondary wood, it would have had to establish a population in the face of competition from the communities formed by earlier arrivals.

Anemone nemorosa is only one of about 50 vascular plant species which are biased in their occurrence to ancient woods. The provisional list in Peterken (1974) requires some changes in the light of subsequent information. For example, Mercurialis perennis was not included, but a full analysis (Peterken and Game, 1981) has shown that this species too has a limited colonizing ability.

ACKNOWLEDGMENTS

I am greatly indebted to Margaret Game, Joan Gibbons, Irene Weston and Peter Weston for valuable discussions and help with field survey.

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PLANT NOTES

I. Weston

Epipactis purpurata
Violet helleborine, Purple Washed or Clustered Helleborine

The violet helleborine, Epipactis purpurata was found and photographed in S. Lincs this year by Mr. M. D. Pool of Grantham, a new L.N.U. member. This is a new Northern limit locality for the species in Britain. The same species was found by the late Mr. Dick Morgan in 1967 and 1968 at Clipsham. It was brought to the notice of the writer, a photographic record taken and subsequently confirmed by the late Mr. Donald Young, the Epipactis referee, also as being at its Northern limit. The new record confirmed by the writer and Dr. F. Perring is the second confirmed record for the County. Dr. Perring wrote that he thinks the species is spreading northward gradually and that there has also been a recent new Shropshire record. The Lincolnshire record was fascinating in that about six plants were found. Epipactis purpurata is a species of calcareous woodland, a Southern species, never common and which flowers late in the season. It was found by Mr. Pool on August 7th 1980.

Dactylorhiza fuchsii - variant form

The drain at Crowle produced five spikes of the variant form of the common spotted orchid (L.N.U. Trans XIX No.3 1978) in 1979 and four spikes in 1980. This was the subject of a photographic exhibit by the writer at the November meeting of the B.S.B.I. in 1978 and evoked much interest amongst orchid specialists. No other like forms are known to have been recorded.

Red Data Book of British Vascular Plants

The Red Data Book of British Vascular Plants (L.N.U. Trans XIX No.3 1978) has stimulated much interest in our threatened species. Naturalists in the Isle of Axholme have found a flourishing population of the large hay rattle Rhinanthus serotina in the Crowle Waste Reserve in a different area from that previously recorded. This is greatly rewarding in view of the scarcity of the species in Britain and its swiftly disappearing habitats. They have also recorded a new site for bog rosemary Andromeda polifolia, not a Red Data Book plant, but one with the Southern limit of its distribution in Britain found in this County. Its distribution in the western bogs makes any Eastern site interesting and this is the second existing record in the historic County of Lincolnshire.

Another of our Red Data Book species - Equisetum ramosissimum - "The Boston Horsetail" has fruited well this year and the population has not diminished. It is still of great interest to botanists and Mr. J. Cannon who farms the land describes the visitors as "varied and including botanists from Boston U.S.A.".

Dr. C. E. Hubbard

Sadly, one notes the death of Dr. C. E. Hubbard - author of the Pelican "Grasses" - who has consistently and with much charm, vetted all the grass specimens which the writer has sent to him from Lincolnshire over the years. He was very interested in all our Lincolnshire specialities and very impressed with the populations of Poa bulbosa and Apera interrupta on the Cleethorpes dunes, which site, he regarded as being of particular interest to grass enthusiasts. He has always given freely his authoritative help and will be greatly missed.

REPORT ON THE 1979 SMALL STREAM SURVEY

P. J. Wilson

Introduction

The first field meeting of 1979 on the 22nd April took the form of an investigation into the upper reaches of the River Glen and Edenham Beck. There is no name given to this latter stream on the Ordnance Survey map. It rises in three small streams at Ropsley, Humby and Ingoldsby, flows by Lenton, skirts Edenham, and having run a parallel course to the River Glen, but separated by about 3 miles, finally joins

that river at Wilsthorpe near Greatford.

As on previous meetings in 1975 and 1976 the aim was to introduce members to freshwater investigations and collecting techniques and if possible commit to paper the finding in the form of a short report to Transactions.

The intention has been to sample Edenham Beck between Edenham and Bulby where the major and minor meanders would have afforded interesting and informative data collections. However, some two weeks previous to the meeting, the main stream had been dredged and banks cleared for approximately one mile below Bulby with much silt deposited in the bed below the cleared length. It was therefore decided on the day to concentrate on the side streams and the upper reaches of both these previously most attracive small river systems.

Method

Members were divided into three groups, each with a team leader with previous experience in freshwater biological collecting and recording methods. Each group was provided with standardised collecting and preserving equipment, maps, and a detailed instruction sheet for the collection of data. This instruction sheet was a more informative version of that used in the 1975 small streams survey and printed in L.N.U. Transactions Vol.XIX No. 1 (1976).

Site No.		
	Group 1	Team Leader P. J. Wilson
1	TF 035268	West of Marwood House Farm) Upper reaches of side
2	TF 038267	" " " " ") stream
3	TF 046260	500 metres west of Bulby village - main stream
	Group 2	Team Leader V. Knight
4	TF 039266	East of Marwood House Farm - side stream
5	TF 040267	" " " " " main stream
	Group 3	Team Leader V. Wilkin
6	TF 005293	1 km. S.W. Ingoldsby Village - side stream

In addition to the above sites on the upper reaches and side streams of the Edenham Beck members from Groups 1 and 2 joined members from Group 3 and moved over to the upper reaches of the River Glen and sampled at two sites;

SK 985285	300 metres west of Bitchfield
SK 974311	300 metres east of Boothby Pagnell

Results

Edenham Beck - Sites 1 and 2 were on the upstream side of Marwood House from where the stream flowed through a grass field (1) and along the field side of the road side hedge (2). Both were about 1 metre wide, 5-10 cms deep, and clear with muddy beds and gradual sloping

sides. There was some slight meandering within the natural bed where the rate of flow was 1 metre in 3 seconds. Gammerus, Assellus and simulid larvae were at both sites. Filamentous algae was present at site 1. Pied Wagtail was seen feeding on stream side at site 1. There were no fish or molluscs found. Site 4 was on the downstream side of the farm and at first seemed to present an ideal small stream meandering through grass fields, with clear water, sandy and in parts muddy, bed, the natural banks were partly cliffed and eroded. The stream at this site was much polluted by a sewage outfall and plastic and metal weedkiller containers (MCPA25). The only life noted in the stream was a few gammerus. The water varied in depth from 5 to 60 cm. and was 1 metre wide; rate of flow as for sites 1 and 2. The banks, which had evidence of water voles, were well grazed grass with hawthorn and elder bushes. Broadleaved dock and hedge mustard were also noted.

Sites 3 and 5 were on the main stream, site 5 was just above the junction of the polluted side stream. Here the stream had been dredged and the banks cleared within the last 6 months. The water was clear, of an even 25 cm depth, and 2.25 metres wide between the sloping slightly embanked sides. The bed was gravelly and stoney. The rate of flow was 1 metre in 3 seconds. Watercress and brooklime were at the water edge with soft rush, hairy willow herb and celandine grew on the bank just above them and higher still, teasel. Four species of molluscs were found Potamopyrgus jenkinsi, Lymnaea peregra, Anodunta anatina and A.cygnea. Leeches were numerous (Erpobdell sp.) and in the 25 metre sample length, 2 stone loach and 7 minnows were caught and water vole noted. Site 3 was 1 km below site 5 just above the ford west of Bulby village. The recent clearing had not been too drastic. The stream bed was not uniform but the sand and gravel stretches were still soft and unstable and not yet supporting any of the larger life forms. Some reed sweet grass had survived along the edges of the turbid 2 metres wide stream. The rate of flow was 1 metre in 3.5 seconds. The banks had been given a 60° slope but hawthorn, teasel, figwort and purple small reed were growing there. There was a grass field on the eastern side; the one on the other side was ploughed. In addition to the molluscs at site 5, Ramshorn and a Pisidum species were found. The corixed Sigara dorsalis was found in the quieter stretches of water, and in the sample 25 metres 5 species of fish were caught:- 1-ten spined and 3-three spined sticklebacks, 1 minnow 3 stone loach and 1 gudgeon. A few Assellus were caught.

Site 6 on the small side stream near Ingoldsby differed considerably from the other sites. There had obviously been some interference in the past as the stony bedded stream had uniform banks sloping at 60°. However these were clothed in scrub composed of willow, hawthorn, blackthorn, ash and bramble. Meadowsweet, rosebay willowherb, celandine, nettles, coltfoot, figwort and wild arum were also noted. The aquatic plants included horsetail and water starwort. A pair of Mallard were seen and there was ample evidence of water vole. Occasional small leeches were found but no molluscs or insect larvae. The water was clear, 30 cm deep, and between 1 and 2.25 metres wide with rate of flow 1 metre in 5.5 seconds.

River Glen

Only 2 sites were sampled and both of these were on the higher

reaches. The river at Bitchfield was some 6 ft. below the level of the surrounding ploughed and grass fields. There was evidence of great fluctuations in depth but at the time of sampling there were shallows and deeps varying between 35 and 70 cms. The water was turbid and the bed consisted of sand and gravel. The banks were steep with a 60° slope and judged to have been modified some 5 years previously. Where the course had been cleared out to a uniform depth, the river between 2 and 3 metres across was attempting to form meanders within its constraints. Watercress was growing at the stream edges; persicaria and hairy willowherb on the exposed sand and mudbars. There were beds of Glyceria maxima at the water edge with nettles and meadowsweet on the banks. In the 25 metre sample length gammerus was common and empty caddis cases found but only 1 leech. There were 2 ten-spined and 5 three-spined sticklebacks.

The last and highest site on the Glen was the most natural site examined during the day. Here at Boothby Pagnell the stream meandered between old pastures. The banks were of low eroding cliffs and the stream between them had shallows and deeps with vegetated mud banks some 2.5 metres across. Water depth was between 5 and 20 cms., but up to 1 metre in the pools on the outer curves of the meanders. The stream bed was sand and gravel, but in parts almost choked with mud, supporting a dense growth of floating sweet grass, starwort, watercress and brooklime. Lesser water parsnip also grew in the mud and the banks had hard rush, hawthorn, alder, dog-rose, bramble, rosebay willowherb, yellow cress and celandine. Three species of molluscs were found - Lymnea peregra, Trichia hispida and Monacha cantiana. There were also 3 three-spined sticklebacks. It was a pity that the failing light did not permit a more lengthy examination of this attractive area.

Common names of molluscs mentioned above

Potamopyrgus jenkinsi	-	Jenkins spire snail
Lymnaea peregra	-	Wandering snail
Anodunta anatina	-	Duck mussel
Anodunta cygrea	-	Swan mussel
Trichia hispida	-	Hairy snail

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Wood mouse - photograph by John East

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